

CTO

THE MAGAZINE FOR INFORMATION EXECUTIVES

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COVER STORY

Mining For Gold

Tapping Into MasterCard's
Customer Information

ALSO INSIDE

Is Java Ready
For Prime Time?

MasterCard International's
Anne Grim and Rob Reeg



If technology keeps moving

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COVER STORY

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Mining the Possibilities

Member banks wanted access to data on cardholders' buying patterns. Here's how MasterCard delivered, building a data warehouse in just five months.

By Tracy Mayor

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Cover photo by Edward Santalone

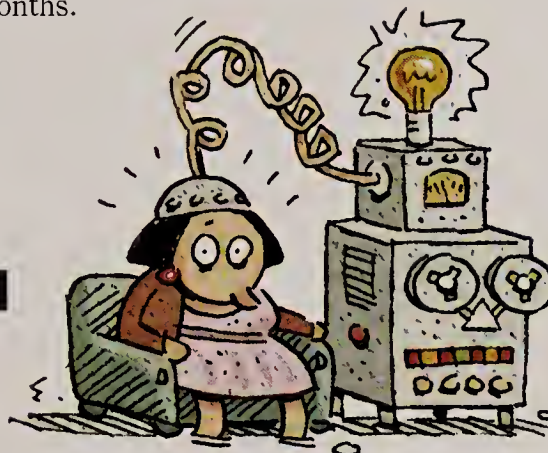
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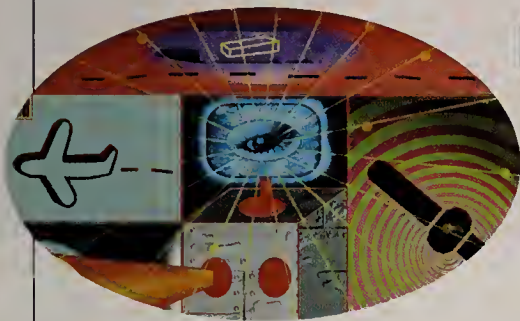
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Logistics once had a simple formula: Manufacture products in long runs and move large quantities in as few shipments as possible. Today it's not so simple.

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Light at the End of the Chunnel

Systems for the English Channel's Eurotunnel were developed in the dark—without customers, users or clear knowledge of operating requirements. Now the Franco-British IS crew is hard at work on a three-year system reconstruction project.

By Marsha W. Johnston

MORE >>>



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What's the most important piece of information in your company? What data or knowledge can tell you whether the company will succeed or fail? Once you can answer those questions, you can save megabucks in consulting fees or make a few bucks by becoming a consultant yourself.

By Tom Davenport



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When technology and business intersect on the information highway, it's likely to be the CIO who ends up directing traffic.

By Anne Stuart and Cheryl Dahle



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Beyond enabling interactivity and animation on the Web, can Java supply the jolt organizations need to make truly distributed, networked computing a reality?

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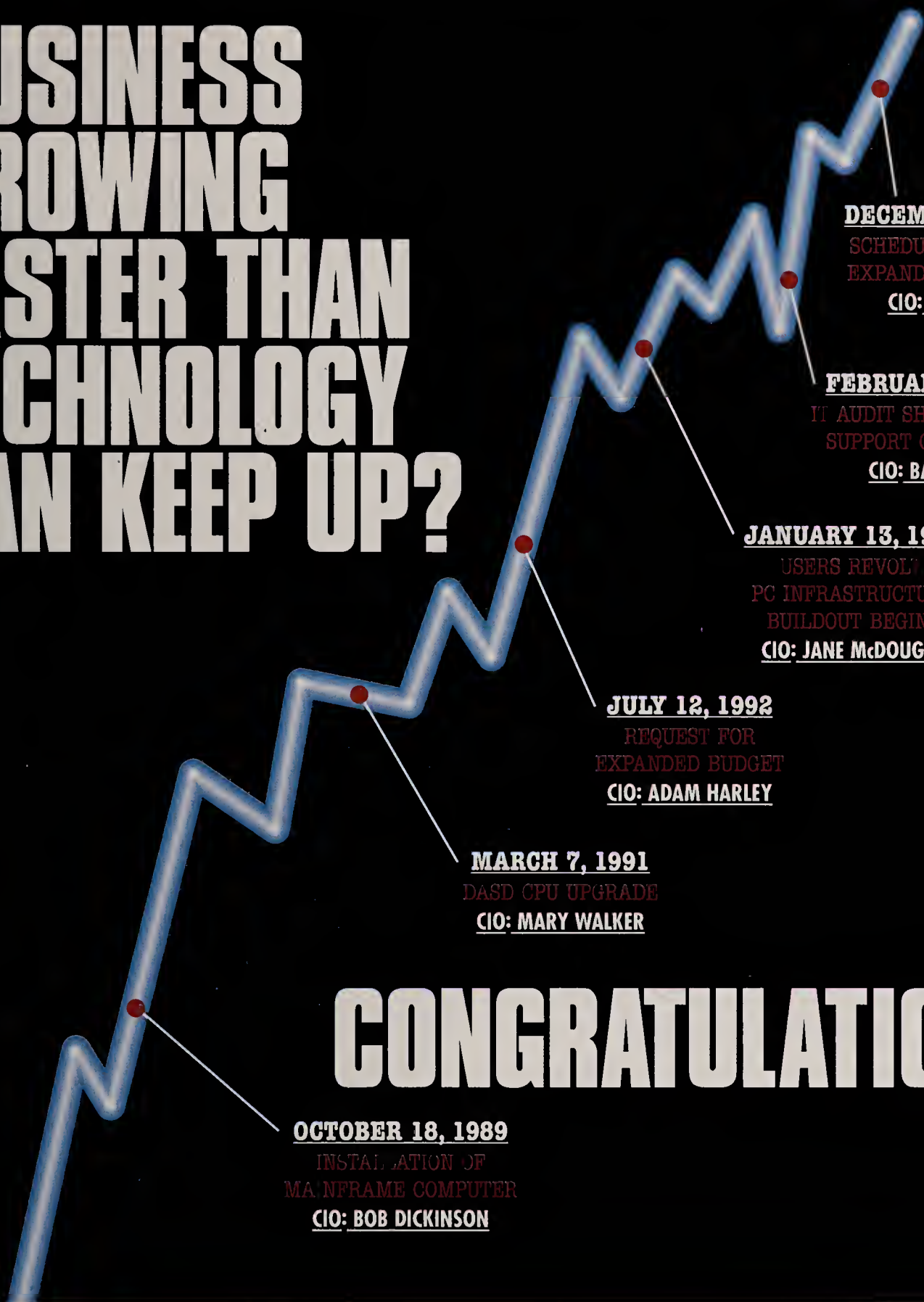
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BUSINESS GROWING FASTER THAN TECHNOLOGY CAN KEEP UP?



CONGRATULATIONS!



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Most IS executives (at least the truly effective ones) think a lot about strategy. They think a lot about technology. They even think a lot about management. But how much time do you spend thinking about information itself?

If the emphasis is really on the "systems" part of IS (or the technology part of IT), maybe we (and a few thousand CEOs) goofed. Maybe the name of this magazine should be *CTO*. Perhaps it would be easier to get your arms around the role of chief technology officer. As *CTO*, you might not feel so compelled to

understand the way employees in your company use information to do their jobs. You wouldn't have to worry about things like knowledge management and intellectual capital.

Well, sure, that'd be an easier row to hoe, but what would the crop look like? Think about it. Your organization's efforts at globalization, improving customer satisfaction, speeding product development—whatever—wouldn't be successful without someone thinking about the strategic use of information. That's one of the reasons so many data warehousing efforts go awry; the people implementing the technology don't understand who needs what information when or why.

There's some indication that IS executives are very concerned with information management. "Organizing and utilizing data" was ranked the second most critical IS management issue by respondents to a Computer Sciences Corp. survey. Indeed, it was just barely edged out by "aligning IS and corporate goals" for the top spot. (For more on that survey, see the June 15 issue of *CIO*.)

But maybe that's not *your* responsibility. Maybe that set of issues properly belongs with someone else. There's no question that just staying on top of the technology can be a full-time job.

So what I'd like to know is, how much *do* you think about information? Do you consider yourself an information officer or a technology strategist? And if you don't think of information as a core and critical part of the job, why not?

I'd love to know your opinion. You can reach me at lundberg@cio.com.

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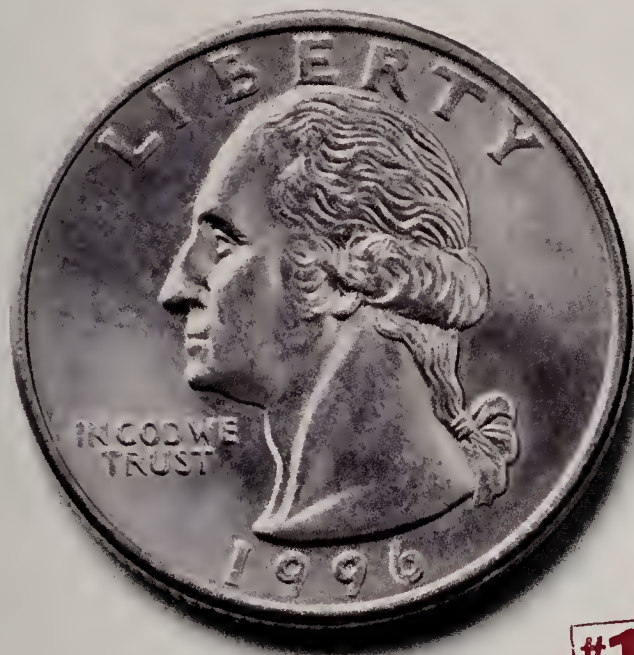
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You've just finished an article in *CIO* Magazine. Now what? Do you sometimes feel compelled to offer a differing opinion from the writer's? Would you like to pick the brain of the CIO mentioned in the story? Was there a vendor mentioned that you would like to learn more about?

This summer, the *CIO* Web site is introducing a number of interactive features that will enable you to truly connect with your peers, our writers—and information management experts. Starting June 17, you will be able to participate in our Interactive Article Forum. Selected *CIO* articles will become topics for interactive discussion at our

Web site. The first one we've got lined up is a discussion about SAP and the software enterprise package philosophy. Be sure to read about SAP in the June 15 issue and then join in the discussion about the pros, the cons, the triumphs and the disasters.

Also be sure to check out the CIO Meeting Place. This forum will allow you to network with IT peers and business executives. Throw out a question. Jump in on a discussion. Give advice. If you're looking for answers from the people who've been there, this is the place to bookmark. In addition, the CIO Resource Center will provide info and resources on the most pressing topics facing IT executives, such as "The Role of the CIO," "CIOs in the Government" and "Change Management." And we've got a lot more planned, so stay tuned.

If you haven't been to the *CIO* Web site lately, drop on in and see what's new. You can find us at <http://www.cio.com>.

Wayne L. Wertz

P.S. The first WebMaster Perspectives conference will take place Aug. 11-14 at the Westin St. Francis Hotel in San Francisco. Meet and network with executives facing similar business challenges and opportunities, and learn how to effectively conduct business for profit on the World Wide Web. For more information, please call 800 355-0246 or visit our Executive Programs pages on the Web at <http://www.cio.com/conferences/proghome.html>.

Coming In CIO

SPECIAL FOCUS: SAP Software

SAP software's promise is alluring. Its off-the-shelf modules control finance, manufacturing, distribution and human resources, providing organizations a single software solution rather than multiple packages kludged together by complex interfaces. But CIOs worry that SAP will blow their budgets—and their careers—to smithereens. Because SAP simultaneously inspires so much fear and fervor, for those swept up in the movement are left with several issues to wade through. At least a few things *are* certain: The software works, but getting an organization to follow the software's mandate is not an easy—or inexpensive—task. *CIO* will focus on the package and what it means to information executives.

Who's Guarding Your Nets?

Security experts agree that the unhappy worker, careless consultant or unattended temporary worker are as much—if not more—of a danger to corporate security as the willful, wily hacker. Good security begins and ends internally. A company's security policy should safeguard corporate data against malicious employees, contractors and consultants as well as protect it from the malevolent intruder. *CIO* will explore issues of tampering, hacking, deliberate destruction of data and mistaken corruption of data.



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Your Worst Nightmare



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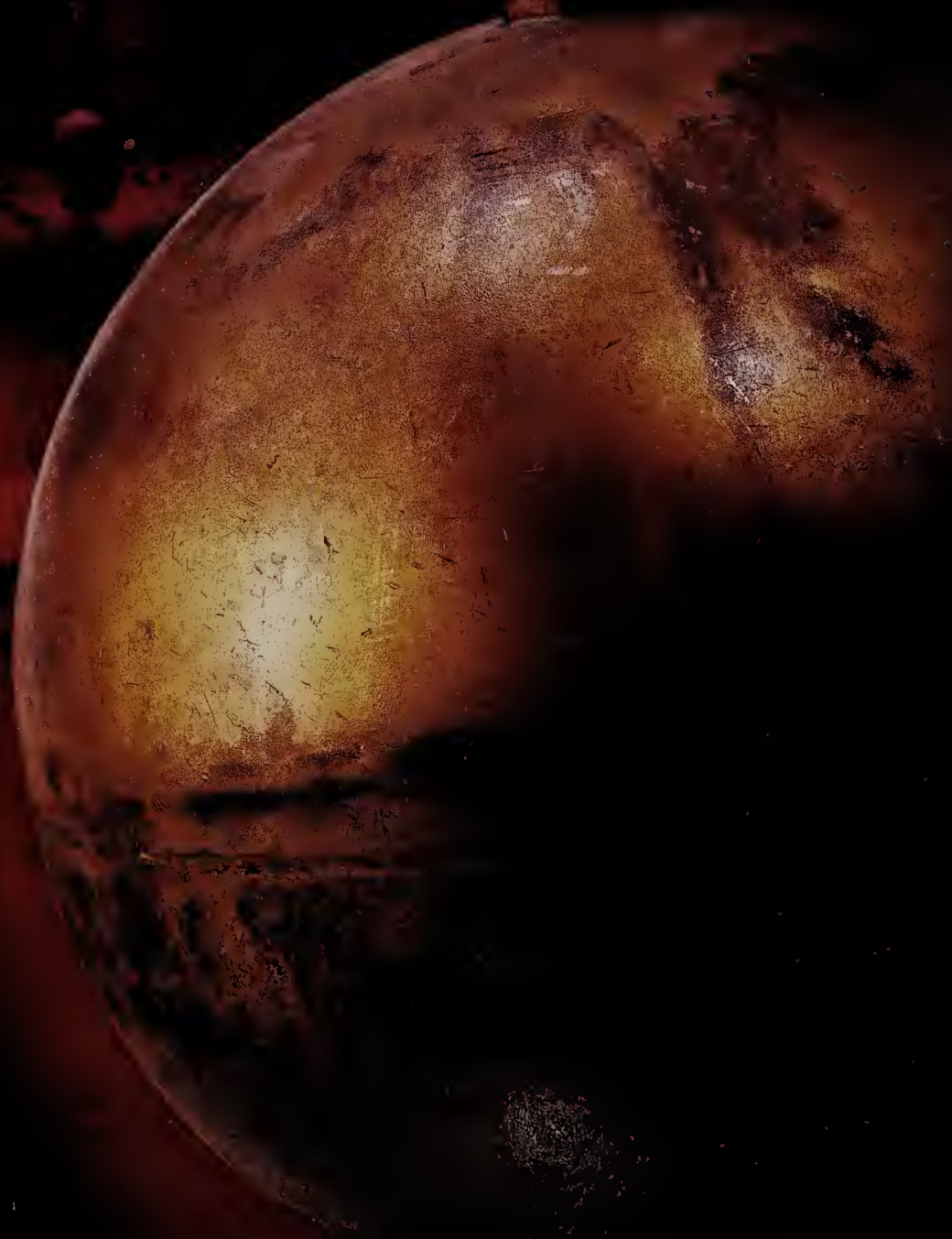
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Microsoft

WHERE DO YOU WANT TO GO TODAY?



Will the Internet bring an end to business computing as we know it?

Not at all. It will simply knock down the walls between people, between departments — even between companies.

The promise of the Internet, while intoxicating to some, is threatening to others. Because along with the unlimited access and opportunity it provides, comes the need for new strategies and new technologies. Happily, those who've begun the transition to client-server already have much of what they need in place. And to help businesses incorporate the Internet and intranet into their operations, Microsoft is integrating the necessary technology into many of its products — from desktop to server to tools.

For example, it's never been easier to connect desktops to the Internet. That's because both Microsoft® Windows® 95 and Windows NT® Workstation operating systems have all the "plumbing" built right in. Viewing content is just as effortless. With Microsoft Internet Explorer, users can browse the Internet (or internal corporate webs) whether they're working on the Windows platform or on the Macintosh.™

Of course, making web content easy to view is only the beginning. To be useful to organizations, content has to be easy to create, too. Which is why the latest generation of Microsoft Office applications, along with Internet Assistants, allow users to develop web content without programming. They simply save their work as HTML, the way they would any other document. Such ease-of-use also extends to the newest member of the Microsoft Office family, the Microsoft FrontPage™ web authoring tool, which lets users create and manage entire web sites, even if they've never so much as programmed a VCR.

The Internet is very much a part of our BackOffice™ family, too. With Microsoft Internet Information Server, we've extended the performance of Windows NT Server to make the ideal Internet platform. Now every organization can host and manage web content and applications securely and reliably. And, with Microsoft Exchange Server, secure and reliable e-mail is also a reality, whether it's traveling over the Internet or within your organization.

The truly interactive web page has arrived as well...and with it, full motion video, audio and moving text. Advances made possible by technologies like ActiveX™ controls, which let developers embed sound, video, and applications without having to learn new languages.

Yes, the walls are coming down, but it's not the end of business computing. Just the next, most practical evolution.

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TRENDLINES

WEB MARKETING

HAVE THEY GOT A DEAL FOR YOU

With superstores like Circuit City's IT-intensive CarMax leaping into the car sales fray, an increasing number of car dealerships are taking to the Web to pitch their products. Last fall, several online businesses, including 2BuySell (<http://www.2buysell.com/>) and Cable Cars (<http://www.cablecars.com/>) began offering car dealers a home on the Web, and hundreds of individual dealers are scrambling to set up Web showrooms to attract customers.

Economic demands are pushing car dealers online, says Ann Keegan, production manager for Prime Communications, the advertising agency that produces the Cable Cars Web site and TV infomercials. "They've had a tough couple of years," she says. "They're very open to any kind of new idea to sell cars. They'll try anything."

Cable Cars, which went on the air in July 1995 and on the Web in November 1995, offers online lists of cars available from participating



dealers, along with basic information such as mileage and photographs of vehicles. Keegan says response to the Web site has been good. "People are selling cars off of it," she says. "The dealers love it."

Deepak Singh, co-founder of 2BuySell, says many dealers are going online because they think their competitors are reaping Web gains. "It's like a self-fulfilling prophecy," he says. 2BuySell's site lets visitors search a database of used car listings and features links to individual dealer pages, which offer static displays of inventory and car descriptions. 2BuySell produces Web pages for almost 20 dealerships around San Francisco and plans to expand elsewhere.

Some dealers produce their own Web sites. Visitors to <http://www.suzukict.com>, the site of Dan Perkins Suzuki, which has six stores

in Connecticut and New York, can access new and used car inventories plus details on the dealership's One Price sales policy.

Although Cable Cars dealers report success, few Web marketing efforts have rolled in significant returns so far. Kevin Wong, general sales manager for Ron Goode Toyota in Alameda, Calif., says the dealership can't attribute

any car sales to its Web presence on 2BuySell. "I don't see this happening yet," Wong says. "But down the road, as technology gets better and better and things get cheaper and cheaper, it'll be a way of life. Why not get in now?"

At press time, Perkins Suzuki had sold fewer than 10 cars from its site. But the dealership's treasurer, David Danilowitz, says the company still plans to install in-store touch screens and other IT tools to keep pace with competitors. "Anything you can do to make [buying a car] easier is going to give you the edge," he says.

—Heath Row

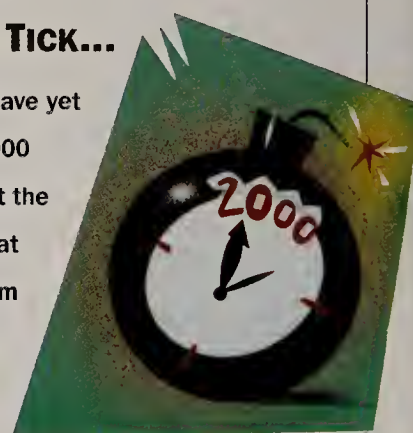
TICK, TICK, TICK...

Time's a-wasting for CIOs who have yet to tackle the infamous year 2000

issue. Gartner Group Inc. warns that the dance cards of service providers that offer solutions to this vexing problem are quickly filling up. "By the end of 1996, external service provider capacity will reach saturation, es-

pecially for qualified project management," according to analysts Bruce Hall and Kevin Schick of Gartner's Applications Development and Management Strategies service. "After that time, expect substantial price increases, long lead times to get resources, poorer-quality resources or refusals to bid."

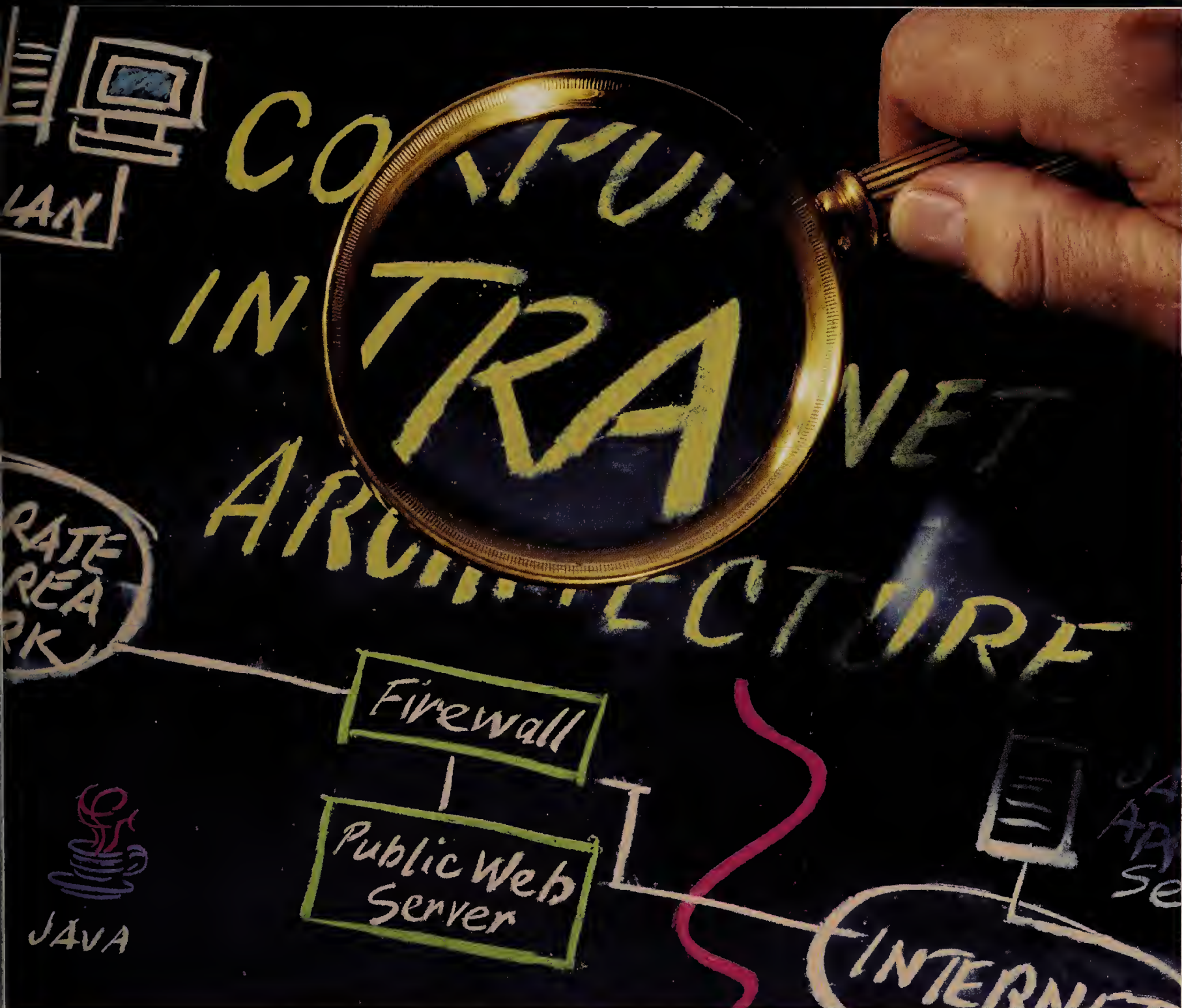
Hall and Schick recommend that IS executives draw up tightly crafted requests for proposals (including software inventory information) for year 2000 service providers. But before doing so, CIOs should secure senior management sponsorship, budget at least enough for an assessment project and assign dedicated personnel to the project. They also advise companies to commit resources for the entire project by the end of 1996. ■



ON THE INCREASING POWER AND FALLING PRICES OF COMPUTERS:

"If we had similar progress in automotive technology, today you could buy a Lexus for about \$2. It would travel at the speed of sound and go about 600 miles on a thimble of gas."

—John Naisbitt, *Global Paradox: The Bigger the World Economy, the More Powerful Its Smallest Players* (William Morrow & Co., 1994)



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TRENDLINES

MASS CUSTOMIZATION

IF THE GOWN FITS...

Chances are, most of the brides marching altarwards this month wasted several weekends hauling themselves in and out of various white, puffy monstrosities in search of the perfect wedding dress. Chances are also good that they never found said dress and had to compromise. However, today's bride can now create the dress of her dreams, thanks to a mix of couture and—what else?—technology at Boston's House of Design Ltd. There, brides work with fashion designers to create gowns on a computer.

The multimillion-dollar wedding-gown industry is a logical candidate in the retail industry's move toward "mass customization." Companies like Levi Strauss & Co. of San Francisco and The Custom Foot Inc. of Westport, Conn., have introduced computer-designed, custom-fit jeans and shoes, respectively, during the past two years, and many experts say that apparel retailers will increasingly turn to IT to deliver reasonably priced, individualized clothing within a reasonable time frame. Wedding dress retailers could use help in both categories; gowns can cost thousands of dollars and take about six months to arrive.

"It's a dinosaur market," says Ken Newlands, who



founded House of Design along with Rebecca Lewis, a designer of bridal attire and Hollywood costumes. Picking out a dress is a time-consuming and expensive task, and gowns frequently need extensive (and costly) alter-

ations. "What should be a most enjoyable experience turns into a huge headache," Newlands says.

Hollywood's reliance on technology to design costumes opened Lewis's eyes to the possibilities for similar uses in making nuptial gear. She says she figured that brides would jump at the chance to get a custom-designed, custom-fit, couture-quality gown within six weeks, all for about \$1,500—the midrange price of a wedding gown.

After discussing dress styles and the wedding's setting with Lewis, the bride-to-be heads to the component room, which houses all sorts of dress parts, including sleeves, bodices and skirts, as well as accouter-

ments such as veils and gloves. There, she refines her vision by playing dress-up with dress parts.

Then it's time for the computer. Either Lewis or head designer Stephanie Griffin works with the bride to draw a detailed version of the dress using House of Design's proprietary fashion CAD software. The bride's measurements (over 30 of them) are entered into the computer, which creates a customized pattern on a networked pattern-making machine. The bride takes home a color illustration of the dress, and, after a couple of more fittings, the dress itself. The idea, says Griffin, is to give the bride all the fun of picking out a one-of-a-kind dress without the hassles.

House of Design plans to open several more cyberbridal salons. If you just can't wait until one comes to your town, visit the company's Web site at <http://www.hod.com>. —Carol Hildebrand

AN E-DECENT PROPOSAL

Catie Smylie and Bob Norris both live in Columbia, S.C., but their romance began not with introductions by mutual friends or when their grocery carts collided in the local Winn Dixie. No, they met and fell in love in a cyberspace chat room. So when they decided to tie the knot, Norris didn't get down on his knees to pop the question—he went online, proposing via Joe Boxer's world's largest e-mail display in New York's Times Square.

As the happy couple said their "I do's" April 3 beneath the Joe Boxer billboard at 42nd Street and Broadway, their vows were digitally displayed on the billboard's 100-foot-long message strip. Joe Boxer's chief underwear officer, Nicholas Graham—who happens to be an

ordained minister as well as the founder of an underwear company—performed the ceremony.

Since September, the world's largest e-mail bill-

board has been flashing 18 hours a day with messages—including nearly a dozen proposals—sent to the company's Web site (<http://www.joeboxer.com>). ■

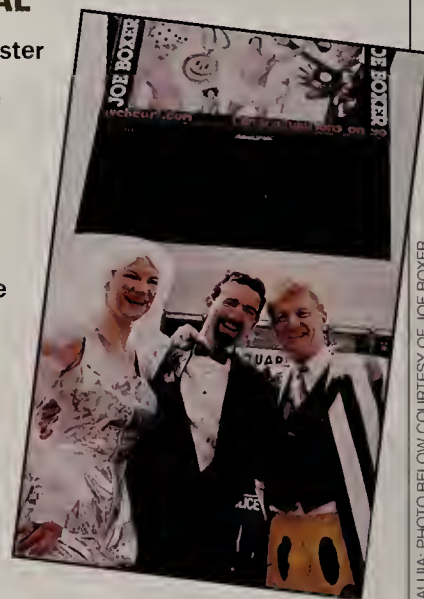


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Meeting the Challenge of Client-Server Computing

Maximizing Return-on-Investment of Network Computing

The migration to client-server computing is affecting organizations both large and small almost everywhere on the planet. Computer users today have extensive access to global network-based resources, including communication gateways to other companies, individuals, and markets worldwide. Signs of this connectedness abound:

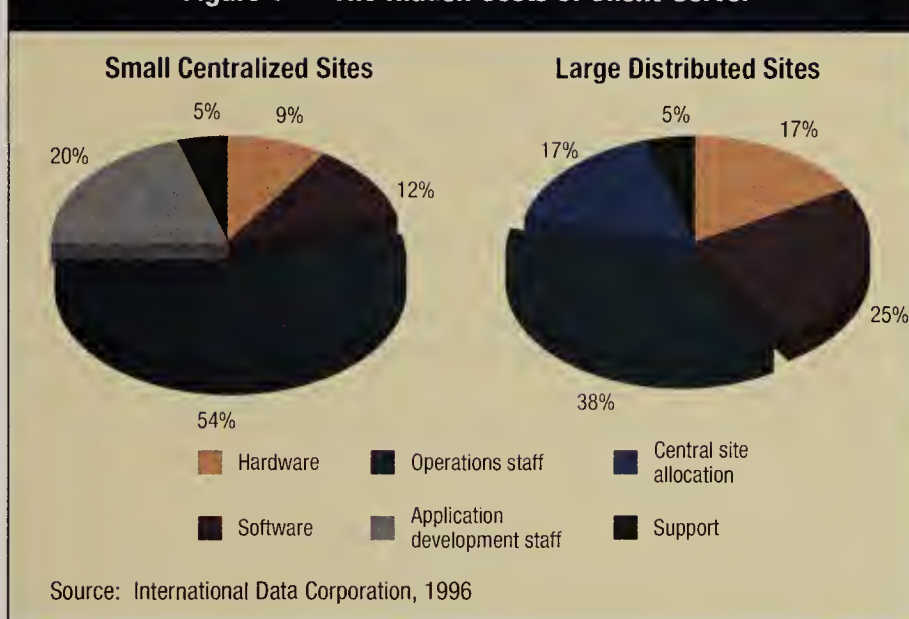
- Last year the number of LAN users worldwide hit nearly 100 million, double the number in 1993. By 1999 the number will double again
- In the same year the number of people in the world with electronic mail boxes topped 40 million. By 1999 the number will be over 125 million
- Groupware users numbered over 30 million worldwide by the end of 1995; by 1999 they will number over 250 million

So we are heading for a wired workplace, a wired marketplace, even a wired society. However, there is a price to be paid for all this connectivity. The nearly universal implementation of client-server systems requires living with new levels of complexity and new hardware and software that people must be trained to use. Moreover, highly skilled personnel must be hired to install, manage, maintain, and administer these far-flung networks. The result is that staffing costs have become the largest contributor to total networked computing costs, regardless of the size of the installation (see Figure 1).

Until now, companies have justified the costs and complexities of client-server computing by competitive advantage—it is a very flexible and adaptable computing style. But when client-server is the norm, where will the competitive advantage lie?

IDC believes that companies that learn to manage their networked resources through technology and training will win out over their peers in the long run. Companies that understand the true costs and true benefits of client-server computing

Figure 1 — The Hidden Costs of Client-Server



will generate quicker return for their investments. Companies that relentlessly optimize, integrate, and upgrade existing systems will stretch IT resources further and be able to reinvest sooner than competitors taking a wait-and-see approach.

Areas of Opportunity

IDC and Novell have teamed to produce this White Paper in order to help IT managers develop a strategy for maximizing return on investment in networked computing resources. It is the executive overview of three studies researched and written by IDC and sponsored by Novell. In the research it conducted,

Driving Down Networking Costs

GroupWise:

Typical annual return-per-user of 334%

Nearly \$400,000 a year saved in phone costs at Farmland Foods

Courier costs cut \$16,000 a year at Sheppard, Mullin, Richter & Hampton

NetWare 4:

On average 15% less expensive than NT Server from Microsoft

50% increase in users supported by a single server

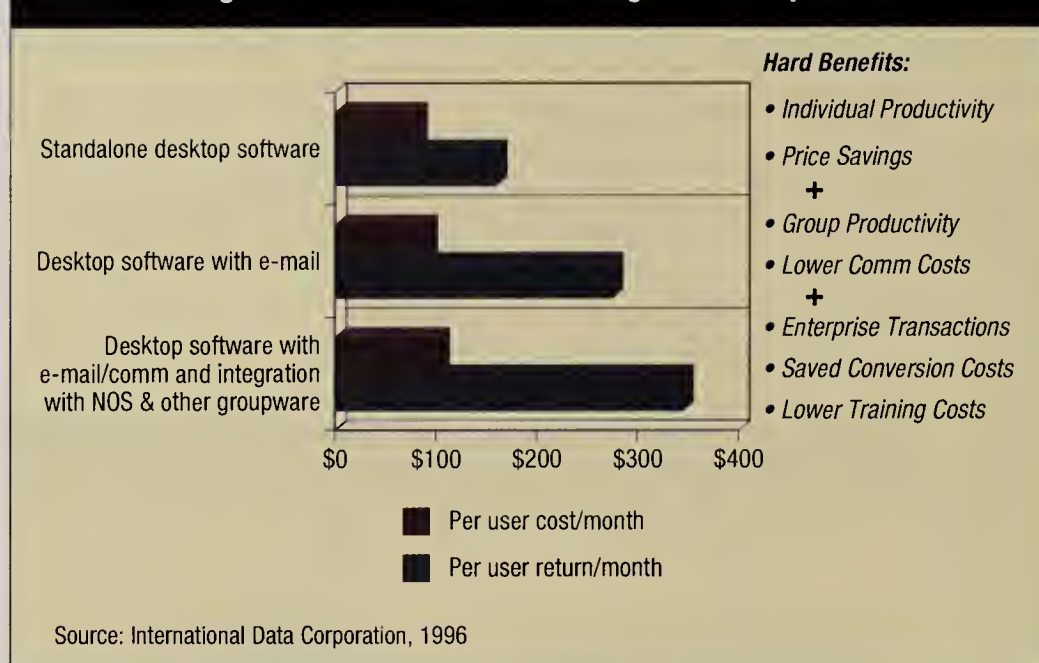
ManageWise:

\$95,784 savings in business efficiency per 100 users

50% reduction in network downtime

19.7 day payback

Figure 2 — The Investment Leverage from Groupware



IDC found three areas of networked computing that are focal points for ROI leverage:

1. The choice and use of communication applications such as e-mail and groupware
2. The choice and use of next-generation network operating systems
3. The use of advanced network and system management tools

In addition, IDC found that when products in support of all three of these areas work together in an integrated fashion—such as Novell's GroupWise, NetWare 4.1, and ManageWise products—benefits are compounded. Support and training costs are lower, conversions and upgrades occur faster, applications come on stream sooner, and downtime is reduced.

Applications for the Next Wave

The migration to client-server computing is a quest to provide users with access to information and computer resources beyond their desks. One of the key tools for this is groupware software, epitomized by Novell's GroupWise, software which integrates e-mail with scheduling, calendaring, and other workgroup oriented functions. The market for groupware is exploding as organizations find they can use it—specifically the e-mail function—as a platform for providing workgroup and even enterprise-wide access to information and resources.

In the research IDC conducted, almost half of the business benefits organizations received from migrating to groupware came from better internal and external communications. For instance, Farmland Foods, a \$2 billion dollar meat processing company, found that since installing GroupWise, documents once faxed in 15 minutes now take less than five to e-mail. Further, the use of GroupWise saved almost \$400,000 in voice phone calls a year.

Figure 2 illustrates how electronic communication and collaboration generate cascading benefits. Standalone desktop software can impact individual productivity, but when combined with e-mail, that software can improve the productivity of a whole workgroup, not just the individual user. If the e-mail is specifically designed to work with the desktop software and with the network software, as say Novell's GroupWise is with NetWare 4.1, then those workgroup benefits are compounded.

This efficiency pays real dividends. When Sheppard, Mullin, Richter & Hampton, a Los Angeles law firm, made the move to GroupWise it found the support ratio for lawyers dropped from one assistant for every two lawyers to one for every three. GroupWise scheduling cut countless hours in tasks as routine as setting up meetings; GroupWise e-mail cut courier costs by \$16,000 a year.

For most companies, an investment in groupware is considered an incremental cost. The hardware is already in place, as is the network. Moreover, the support costs—which account for more than 50% of the cost of operating a networked PC—are shared across dozens of applications.

But even with all the hardware, network, and support costs amortized across the groupware software, it's a bargain. IDC's research with Novell's GroupWise customers found that a typical installation required only about \$250 in fully-loaded first-year costs—less than 5% of the annual cost of operating and supporting an end-user personal computer.

For that \$250 investment, those same GroupWise customers found that their first-year return was over \$800 on lowered communication and clerical costs alone. Meanwhile, they accrued an array of other concrete benefits, such as fewer meetings (and thus less travel and meeting administration), easier document handling, and so on. For every single GroupWise customer interviewed by IDC, return-on-investment exceeded expectations.

Modernizing the Network

If the LAN is the heart of client-server computing, then the network operating system is its soul. As LANs have evolved from peripheral information systems to the primary components of mission-critical systems, they have become more robust and more scalable. Along the way they have also provided IS personnel with the tools to manage network resources as never before.

In fact, powerful new management capabilities are why many people are migrating to NetWare 4.1. With more than 375,000

licenses installed worldwide as of 1995, it is the most popular network operating system. Three key reasons for its popularity are:

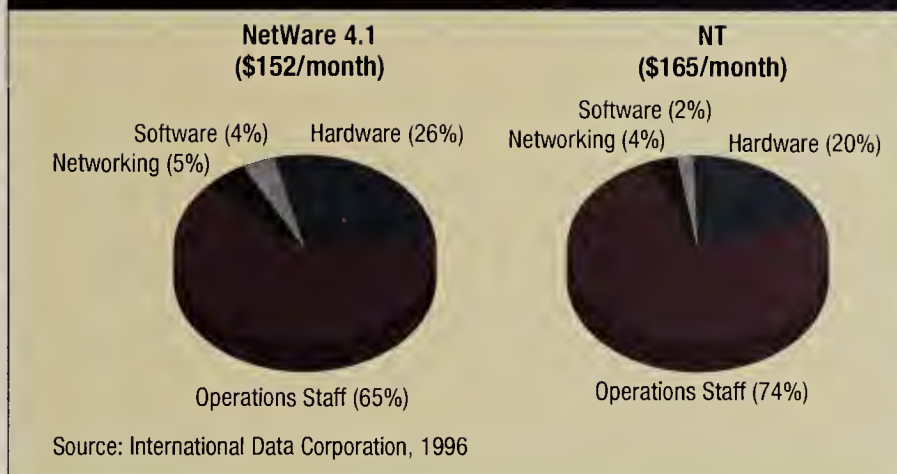
- Greater functionality
- Improved management
- Directory services

Figure 3 illustrates how survey respondents believe migrating to NetWare 4.1 has enhanced network productivity—with ease of administration at the top of the list, mentioned by nearly 40% of respondents. NetWare 4.1's greater functionality has promoted companies' reliance on LANs and delivered on the ultimate promise of client-server—increased productivity.

According to recent surveys conducted by IDC, LAN managers report remarkable improvements in managing their networks under NetWare 4.1. Although they expected the number of nodes on their networks to grow by 260% in the 12 months following installation, they anticipated the number of file servers on the network would grow by only 163%. In other words, under NetWare 4.1, they expect to increase the ratio of users per server from 41 to 60—an improvement of 50%.

In addition to increasing the number of users per server, NetWare 4.1 provides a single point of administration with Novell Directory Services (NDS) that results in a lower cost of network administration. Figure 4 shows how, in medium-sized

**Figure 4 — Network Cost-to-Use at Medium (300 User) Sites
(Costs After Migrating from NetWare 3.X)**



sites, NetWare 4.1 generates 14% lower network administration costs than Microsoft NT, primarily by increasing the user to support staff ratio.

Novell and other networking companies have set their sights on developing new technologies that will make tomorrow's networks more efficient and flexible. Novell has developed a Smart Global Network strategy, which entails making the network available to anyone—anytime, anywhere. An essential component of the Smart Global Network is Novell Directory Services (NDS), which enables companies to keep track of and connect all of a network's users, workgroups, hardware and software on one common access and administrative framework. NDS provides directory services technology that can handle the management of countless resources on heterogeneous systems spread around the globe. Also fundamental to Novell's vision of the future is an open set of application programming interfaces (APIs) that will make it easy to incorporate NDS and other NetWare 4 networking services into distributed applications.

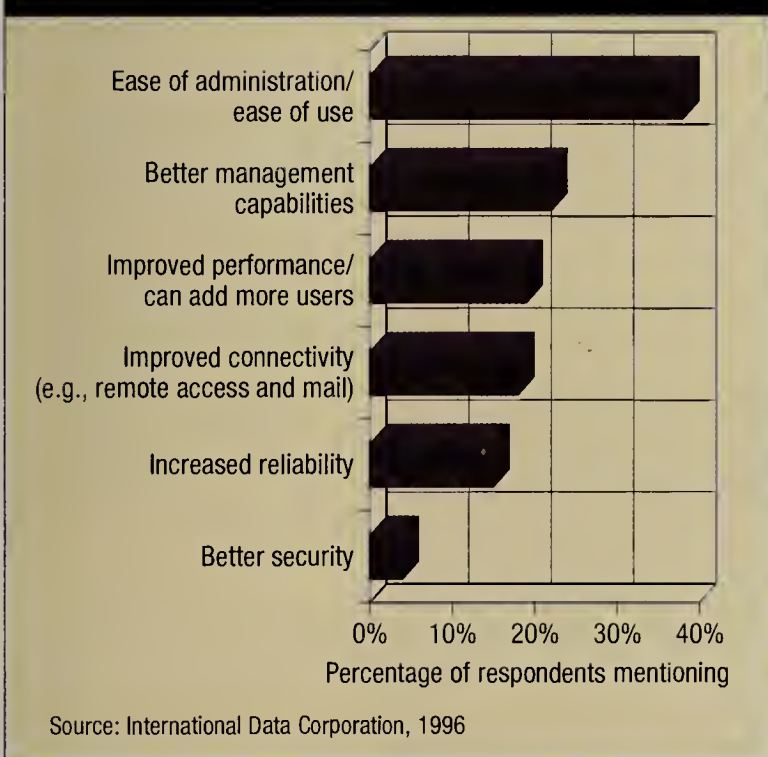
Providing End-to-End Network Management

Staffing costs and end-user productivity are the issues that keep IS managers awake at night. And that has never been more true than it is today. As networks expand and intertwine, the critical success factors for network managers will include:

- Increasing network uptime, both in operation and when installing new users or applications
- Increasing efficiency by supporting rapid network growth without commensurate growth in staff
- Increasing responsiveness, fixing problems in a way that minimizes idle time for users or within business processes

To meet these needs, Novell offers ManageWise. It combines both network management and PC administration into a single, integrated package. Previously, most PC administration and LAN management products worked independently of one another, each requiring dedicated staff and resources.

Figure 3 — How NetWare 4.1 Improves Network Productivity



ManageWise is the integrated solution that offers a single view of the network. It provides analysis tools for understanding bottlenecks; permits the configuration, inventory, and diagnostics of PCs from a single local or remote site; and provides tools for monitoring and managing remote and local servers. IDC's research demonstrates that even small and medium-sized companies can achieve significant cost savings by implementing ManageWise (see Figure 5). Network managers found that the most significant gains in efficiency were realized in server operation and help desk functions. Using ManageWise also increased LAN manager responsiveness. Before implementation, only 30% of network or end-user problems could be solved from a central site; afterwards, that number rose to 60%. This is especially important for companies with highly decentralized operations.

Since the software-licensing, maintenance, and training costs of a product like ManageWise are low compared to the number of users potentially affected, the return on investment can be surprisingly high. Across the survey base polled by IDC, ManageWise paid for itself on average within 19.7 days.

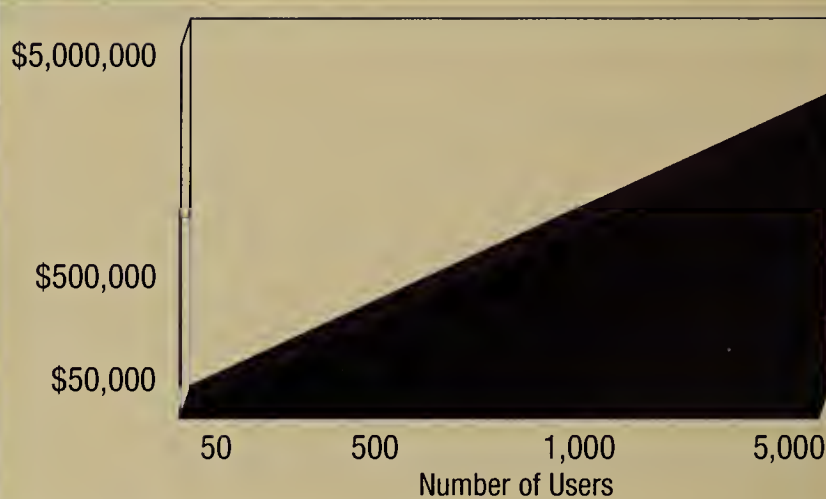
For every 100 users, implementing integrated management with ManageWise saved \$95,784 annually. These savings are attributable to the following:

- More efficient systems management, including an increase of 33% in the number of servers and 25% in the number of PCs a staff person can support, and a decrease in travel of 53%, leading to annual cost savings of \$14,500
- Significant reductions in the time required to perform key management tasks—such as five hours in moves and changes, nine hours in server maintenance and configuration, seven hours in help desk and support, four hours in problem tracking, three hours in printer maintenance, etc.—saving \$30,844 annually
- Dramatic reductions in network downtime (over 50%) due to network outages, delays addressing problems at the desktop, or time spent installing and configuring applications, generating annual savings of \$50,440

Cost-Savings and Client-Server: They Aren't Mutually Exclusive

Believe it or not, return on investment in networking can be quantified. While it may sometimes seem that networks are growing out of control, vendors like Novell are in fact working diligently to develop products for simplified, easily managed

Figure 5 — Average Annual Savings From ManageWise



Source: International Data Corporation, 1996

local, wide-area, and global networks. Because of the strategic and financial advantages of networking wherever systems reside and users roam, organizations will be forced to expand the reach and complexity of their networks simply to remain competitive.

Astute companies will concentrate on migrating to client-server computing in ways that maximize both the resources available to run networks and the effectiveness of those who ultimately generate revenues and profits—namely, end users.

Call to Action

This is an executive overview of a three-part series of White Papers entitled:

- Novell GroupWise: Leveraging Desktop and Network Investments
- Novell NetWare 4.1: Reducing Cost of Ownership
- Novell ManageWise: Maximizing Returns on Networking Investments

For a free copy of the Novell Business Advisor containing tools that help you assess return on investment with NetWare, ManageWise, and GroupWise, as well as electronic versions of the IDC White Papers, call 1-800-665-4586 or visit either the Novell home page at <http://www.roi.novell.com> or the IDC home page at <http://www.idcresearch.com>



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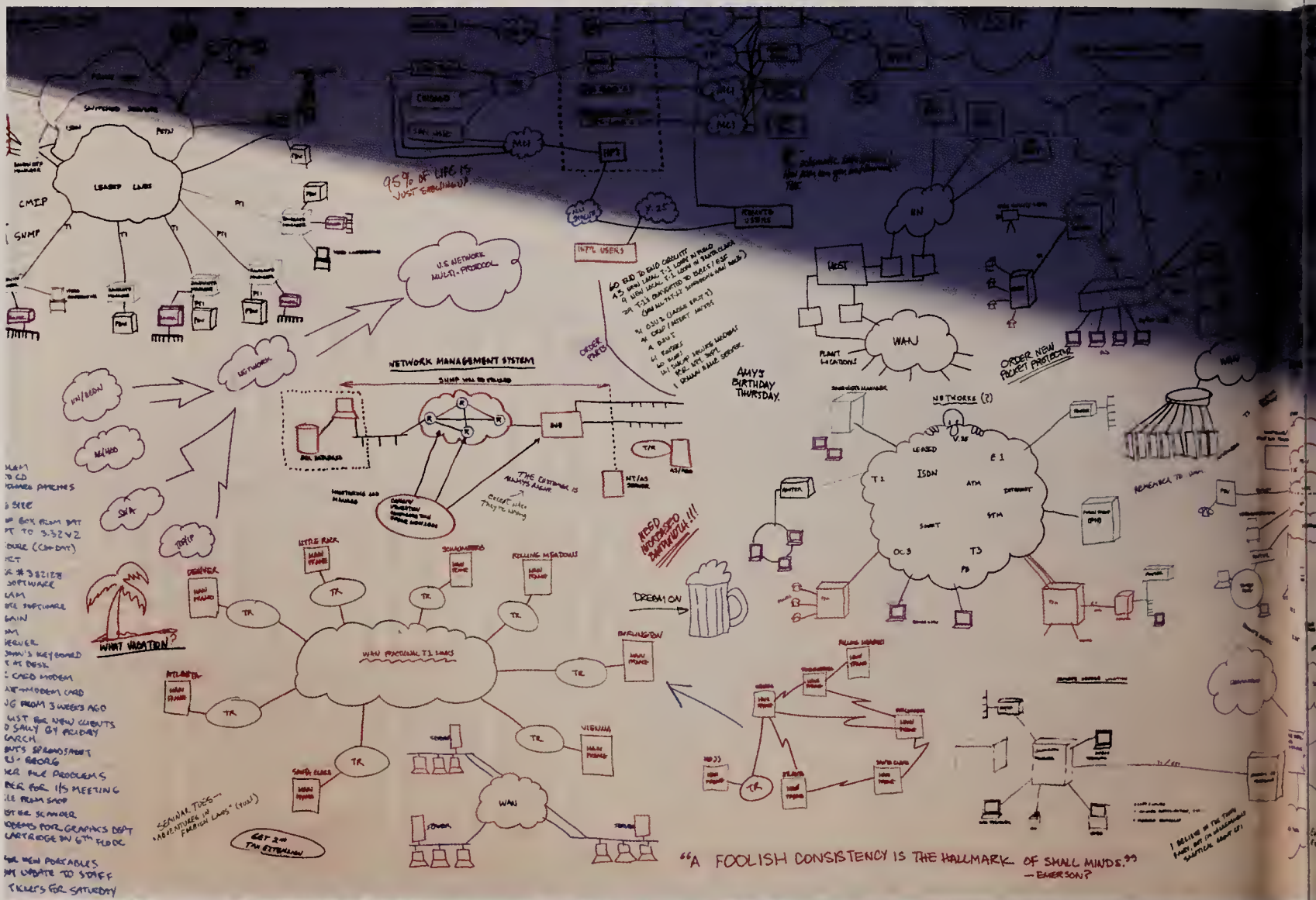
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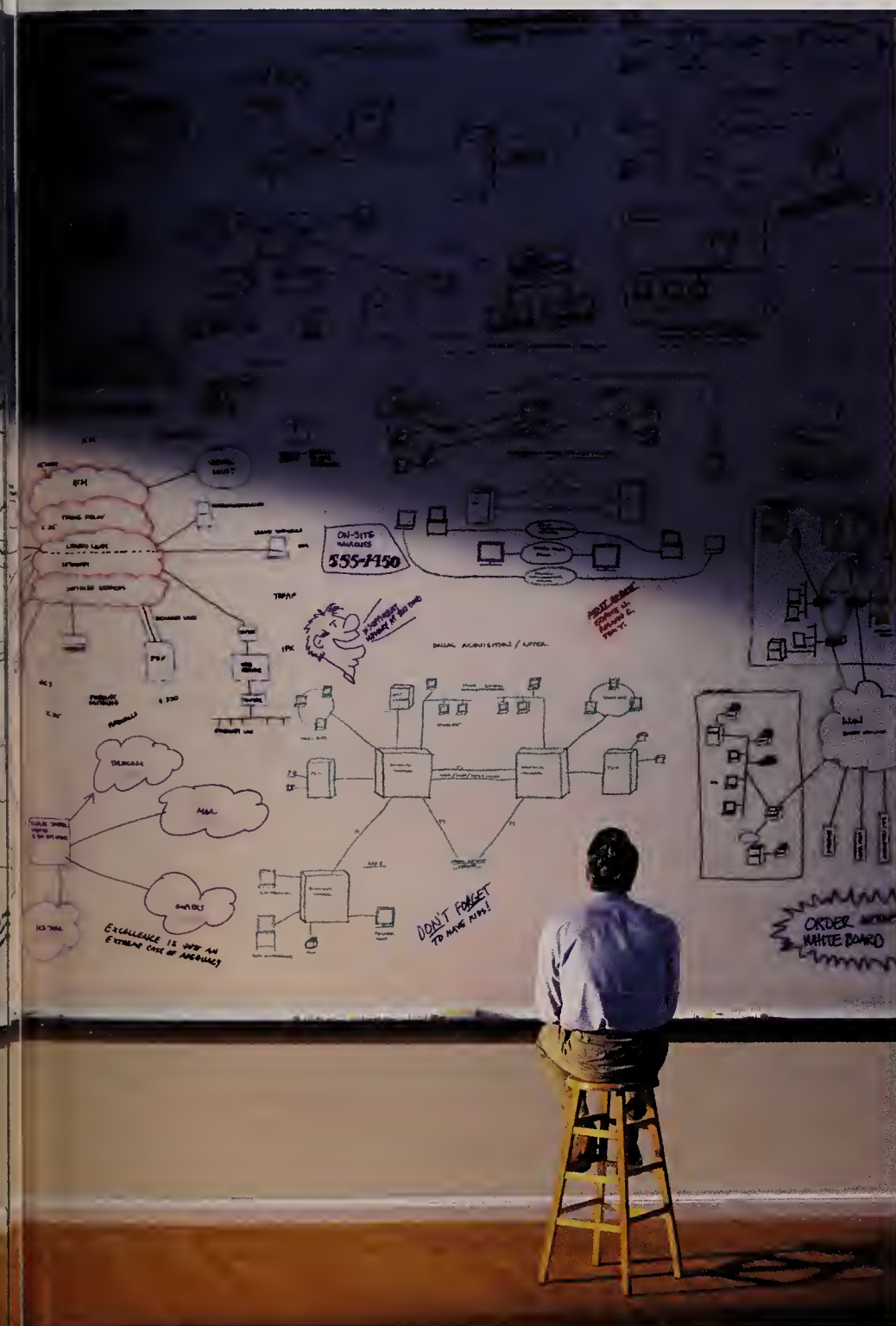
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TRENDLINES

TRUCKING I.T.

10-4, GOOD SATELLITE

The most sophisticated electronics device in a truck was once a CB radio. Today, a trucker's most favored electronic gadget is likely a computer terminal with a satellite data connection to headquarters. Increasingly, rigs are loaded with advanced IT that receives critical data such as routing instructions and payload information from the home

base. These systems promote efficient scheduling and can instantly alert dispatchers to vehicle breakdowns.

Werner Enterprises Inc., a trucking company based in Omaha, Neb., uses a system manufactured by Qualcomm Inc. to stay in touch with drivers. By transmitting written rather than verbal instructions to truckers, Werner eliminates many misunderstandings. The system



tracks the latitude and longitude of trucks, creating a trip history for each truck. With

this data, Werner ensures that drivers aren't on the road longer than Department of Transportation rules allow, says Kirk Hooten, Werner's director of MIS.

"All information is sent electronically, so there are fewer errors," he says. "We monitor whether a truck will meet its delivery schedule. If it's early, we can move up the appointment times. This technology enables us to track our freight 24 hours a day within a quarter of a mile."

In essence, the technology takes the pulse of the company's fleet in real-time. If a truck breaks down, for instance, Werner dispatchers can quickly discern if there are any other trucks in the area that can cover for the disabled vehicle. Likewise, Portland, Ore.-based Freightliner Corp. has begun to equip the trucks it manufactures with sensors that expedite repairs by collecting data on engine performance. The company is considering adding satellite or cellular phone technology to the mix so that trucks could automatically diagnose a problem and call it in to the fleet's dispatch center. Depending on the urgency of the situation, the truck would then either be rerouted to the nearest repair center with the appropriate parts or scheduled for service at the end of its run.

Since implementing satellite communications and decision support systems in 1992, Werner has realized an improvement in on-time delivery of between 5 and 7 percent. Results like that are forcing truckers to enter the

TRACING BLOODLINES

Knowing exactly through whose veins—and which health-care workers' hands—a unit of blood has traveled has always been a challenge. But The Blood Center of Southeastern Wisconsin can track every last red cell and platelet with its new wireless Blood Operations System. Developed in conjunction with Andersen Consulting LLP, the \$5 million blood operations system known as BOS 2000 creates a detailed electronic record of each blood unit's voyage. In the past, this information was tracked manually or not at all.

The system connects remote donor sites such as high school gyms, churches or offices to The Blood Center's headquarters through a portable, suitcase-size base station, which plugs into a dedicated phone line anywhere in the host site building. It provides a dial-up connection to The Blood Center's central computer and communicates via radio frequency with up to 12 wireless PCs in the donation area. The system lets on-site health-care professionals create, access, verify and

update donor records, which are stored at the central office.

BOS 2000 also creates a bar code for each bag of blood, recording such information as the donor's blood type and relevant medical history and who drew the blood. The blood retains this label on its journey through the infectious disease testing lab, the components manufacturing lab, the in-process inventory refrigerator and, ultimately, to area hospitals or other blood centers. When the blood is separated into plasma, platelets and red cells, the system tracks each component. By storing this information electronically, The Blood Center can quickly locate needed blood types in an emergency and recall all affected units if, for example, a centrifuge malfunctions or blood is found to be tainted.

"We have one computer system that eliminates manual steps and additional data entry that could cause error," says Robert Purvis, vice president of blood service operations at The Blood Center. "It's all about safety."

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TRENDLINES

information age, as customers demand levels of performance that can be reached only with IT. This trend could ultimately put small, independent trucking concerns (especially one- or two-person operations) out of business unless they can invest in IT. "The barrier to enter the truck carrier business is higher now because it requires the use of technology," says consultant John Manrodt, a vice president specializing in logistics at A.T. Kearney Inc. in Alexandria, Va.

The IT barrier is likely to

rise even higher, notes Hooten. In the future, trucking firms will keep track of trailers not in use via satellite connections, just as they now keep tabs on full rigs on the road. For trucking companies, knowing where all their equipment is in real-time is essential to maximizing use of their resources. Before long, a truck cab decked with electronic gadgetry may resemble an airplane cockpit. That's quite a switch from a lone CB radio.

—Peter Fabris

EVENTS

Retail Systems 96 Conference and Exposition

June 11-13
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Retail Systems 96
617 527-4626

This event will feature sessions with CIOs in retailing who will share technical issues and facts that will reduce learning curves and implementation times. They will also deliver detailed project reviews on client/server, decision support, store automation, supply chain management and online shopping.

Registration: \$395 to \$695

Managing the Data Warehouse Commitment

June 13 & 14
The Forrestal at Princeton
Hotel & Conference Center,
Princeton, N.J.
Performance Development
Corp.
800 554-9131

This seminar describes in nontechnical terms what a data warehouse is and isn't. Attendees will learn how to build and manage a data warehouse in phases

so that enterprise learning and benefits accrue.

Registration: \$795

Tools & Technology for Self-Directed Learning

June 17-20
The Breakers, Palm Beach, Fla.
International Quality &
Productivity Center
800 882-8684

This conference will provide how-to steps in making the paradigm shift from training to learning. Several organizations will share how they use self-directed and technology-assisted learning to raise productivity, increase intellectual capital and boost profits.

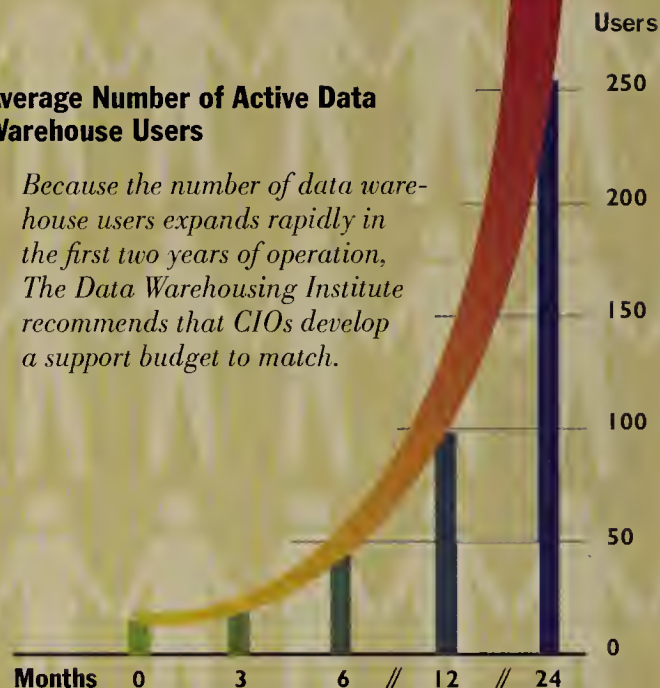
Registration: \$1,295 to \$1,995

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DATA WAREHOUSE USAGE GROWTH

Average Number of Active Data Warehouse Users

Because the number of data warehouse users expands rapidly in the first two years of operation, The Data Warehousing Institute recommends that CIOs develop a support budget to match.



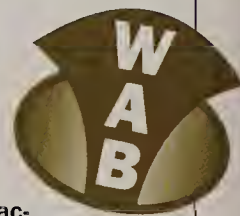
SOURCE: THE DATA WAREHOUSING INSTITUTE'S JANUARY 1996 SURVEY OF 300 COMPANIES. FOR MORE INFORMATION, CONTACT THE INSTITUTE AT TDWI@AOL.COM.

BETTER CYBER BUSINESS

Carpe modem, and caveat emptor no more? With some consumers wary of buying wares on the World Wide Web, an organization like the Web Assurance Bureau (WAB) will be able to step in as an online Better Business Bureau or *Consumer Reports* in cyberspace. On its Web page at <http://www.wabureau.com/>, the Houston-based bureau is soliciting companies with an online presence to join its ranks and secure the WAB seal of approval.

By paying annual dues of \$150 and a one-time fee of \$50 to activate a member hotlink, companies can make a bureau-generated business reliability report available to curious consumers who may question online claims. Consumers can access the reports—which include information about consumer complaints, resolved or unresolved—by clicking on the WAB icon located on member companies' Web pages. Consumers may also file complaints with the bureau, which will pass them on to the businesses in question to facilitate mediation.

The bureau's Web site also includes the WAB Forum, which features consumer alerts and online discussions.



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Ethernet.....#2
ATM.....#2

ROUTERS.....#2

REMOTE ACCESS.....#1

Source: Recently published reports from Dataquest, IDC, and/or Dell'Oro Group.



Think Tank

BY TOM DAVENPORT

Finding the Information that Matters

WHAT'S THE MOST important piece of information in your company? What few pieces of data, information or knowledge tell you whether the company will succeed or fail in the future? On which computer screen, document page or pair of lips can the information be found?

Many companies don't have a clue. They don't know what the key drivers of their business success are, so they don't have measures or indicators of those drivers. They have lots of information systems, but they don't have the information they need to manage their businesses effectively.

How do I know this? I spent nearly 15 years working for three prominent consulting firms. (To protect both the innocent and the guilty, I won't name names.) Each had a different approach to identifying the information its clients really needed to run their businesses. And each has made hundreds of millions, if not billions, of dollars over the years doing just that. Here's how the three firms went at the problem—from least effective to most.

Firm A didn't spend a lot of time on

the issue of what kind of information was needed to run a business, though it did build lots of information systems. For many years, this firm, like several others, employed the Critical Success Factor method for eliciting key information requirements. (A CSF as an information requirements device was defined by John Rockart at MIT.) The technique, which was included in Firm A's systems development methodology, typically involved a few, quick, one-on-one interviews with senior executives, who were asked to name their critical success factors (the things that had to go right in order for the business to succeed) and the information needed to assess them. Then the action shifted to the real problem at hand: building the new system. More recently, the firm has stopped using CSFs. Instead, the client is asked point-blank what information is needed, and then some prototype screens are quickly constructed.

Firm B also used CSFs but in a more thoughtful and effective manner. Instead of assuming that managers knew their success factors and had them at the ready to plop into a consultant's lap, the firm provided

senior managers with typical CSF sets in other industries and encouraged group discussions of possible sets for those managers' own companies. The group discussions and arguments tended to yield more thoughtful CSFs. Still, the major responsibility for determining information requirements remained the client's.

Firm C also asked its clients what information they thought they needed but treated that input as only one—and not necessarily the most valuable—part of the requirements definition process.

A key part of Firm C's analysis involved finding what I call "information leverage points" or information that, once identified, provides a superior map of the roads to business success. Let me provide examples of this concept:

■ A shipping company was losing money on its international operations but didn't know where to start cutting, since it assumed that the ability to deliver anywhere was a key marketing advantage. In this situation, two information leverage points were bearing on the company's decision-making process. One was a



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knowledge of how much, on average, it actually cost to ship a package to different locations. Shipping a package to Bombay, India, for example, cost the company about \$50, but sending the package to a remote village in India cost more than \$200. The second leverage point involved knowing whether customers really cared about worldwide coverage or whether they would be willing to pay widely varying rates for different shipping destinations in the same country. After surveying a sample of important customers, the company found that customers didn't care as much about worldwide coverage as it had assumed, and they didn't seem to mind if the company handed off shipments to a local firm with a cheaper, more extensive delivery network.

■ A television network's news division needed to cut fat to lower its costs. Some important leverageable information included the average cost per news story, the number of stories generated by particular reporters, the number of stories per reporter actually used in broadcasts, etc. They found great differences in reporter productivity that did not correlate well to reporter salaries. Though this information seems obvious in retrospect, the company had never bothered to collect it.

■ A pharmaceutical company wanted to increase sales of a key group of drug products. However, the company didn't know which physicians preferred to prescribe its drug over others', how frequently each physician prescribed the drug and how many pills each physician typically prescribed. Once armed with this information, of course, the company could target its marketing efforts much more effectively.

Firm C identified and gathered these information leverage points in the previous three examples through analytical hustle. The firm's consultants understood the dynamics of their clients' industries. When they didn't know something, they figured out a way to get the information or to make an educated guess. They employed no exotic methodology—just heavy doses of brains and hard

work. They were less interested in building a system than in finding the informational engines to make their clients' businesses hum. Instead of asking its clients what information they needed, Firm C told them.

If I were a client, I would choose Firm C's approach over the other two. Even better, I'd like to figure out a way to stop being a client and deduce these information leverage points myself. Can this be done? I don't see why not, assuming your

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organization employs some smart, aggressive people and is willing to let them devote some time to the problem. There's no methodology for doing it yourself, but some basic rules of thumb may apply.

For example, the Willie Sutton Rule, named for the legendary bank robber, suggests that you go where the money is. What are the key drivers of cost, revenue growth and profitability in your company? It's surprising how little good information companies have about their money's source and its destination. That does not mean you have to focus on standard accounting information. The real task here is to construct a relatively simple model that describes how the company makes money. Then try to attach coefficients or weights to the different elements of the model.

The Jim Davis Rule, named after my graduate school mentor, not to

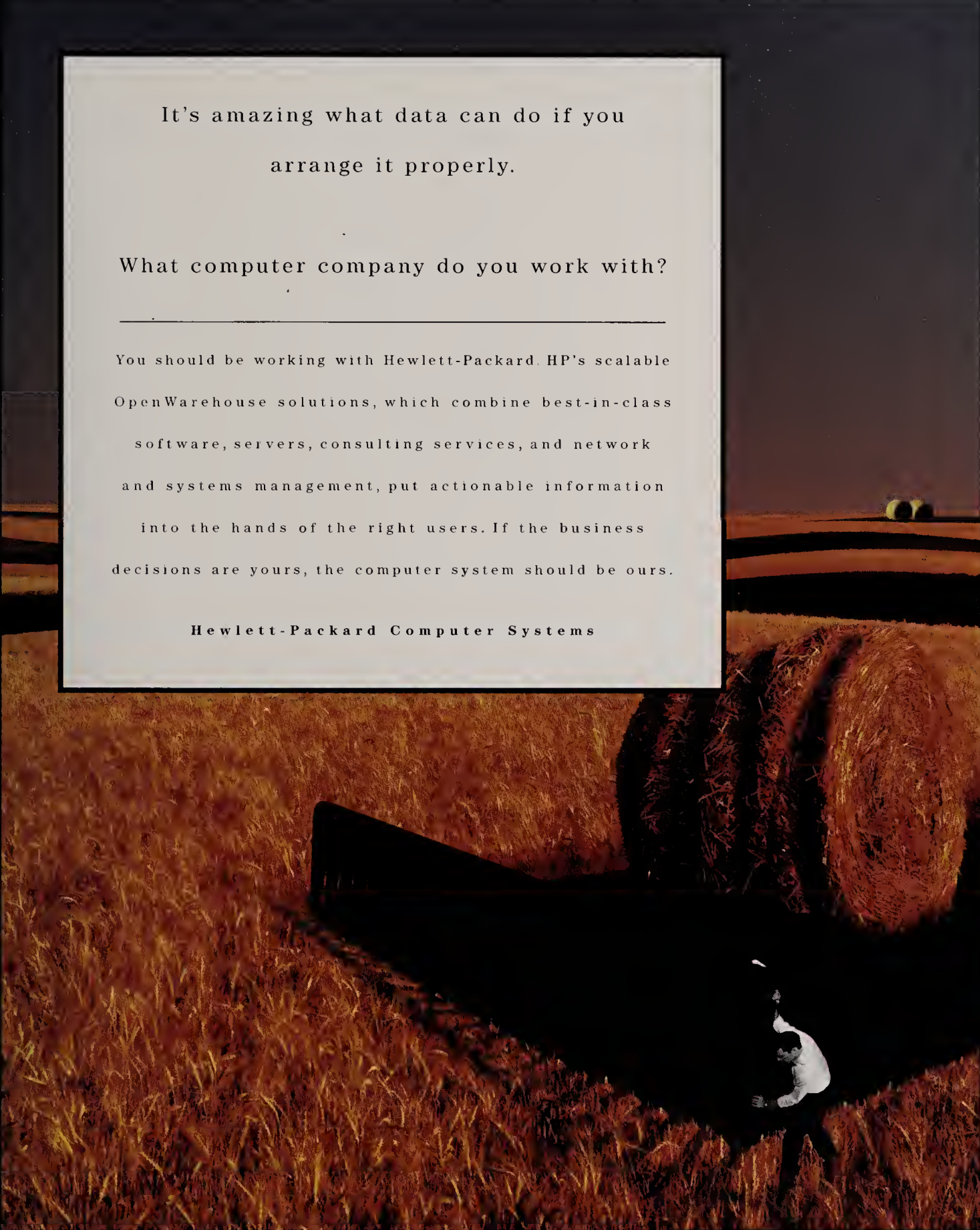
be confused with the cartoonist of orange cat-drawing fame, suggests using lots of statistics but only simple ones. Forget binomial logit regression—I mean means, medians and modes. Figure out the average sale or the median wage of a production line worker. Multiply those figures by the number of things you're measuring and, voilà, you have a useful measure of the big picture.

The Horseshoes and Hand Grenades Rule suggests that if you can't get the exact data you need to determine a leverage point, substituting several related (though less robust) measures that coincide is "close enough." For example, you may not be able to survey your customers, but if you survey your distributors, a customer focus group and the readers of your Web page, and if they all jibe, you've got potentially useful information.

Finally, the Jim Rockford Rule, named after my only enduring childhood hero, calls for getting out into the field and mucking around. When Jim learned of a foul deed, he drove his Firebird to the scene of the crime, started asking questions and, sooner or later, the bad guys popped up. If you want to find out what information really matters, hang out on the production line, visit customers, even chat up a competitor at a trade show. Information leverage points seldom make themselves known to those who sit in offices.

With this advice in mind, you can begin to identify information leverage points yourself. But keep in mind that the information that matters today may not matter tomorrow and, therefore, uncovering those points is a continuous process, not a one-time project. But once you've got this down, you can either save megabucks in consulting fees or make a few bucks by becoming a consultant yourself. **CIO**

Thomas H. Davenport is a professor and director of the Information Management Program at the University of Texas at Austin. He welcomes reader comments at Tdav@notes.bus.utexas.edu.

A person in a white shirt and dark pants stands in a field of tall, golden-brown grass. A large, dark shadow of a person is cast onto the grass, extending from the right side of the frame. In the background, there are rolling hills and a small structure on a hill under a clear sky.

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CIOs at the Crossroads

When technology and business intersect on the information highway, it's likely to be the CIO who ends up directing traffic

BY ANNE STUART and CHERYL DAHLE

Thousands of people just like you are earning money on the Internet with very little experience."—Robert M. Metcalfe, vice president, technology, International Data Group Inc.

It sounded a little like a pitch in a late-night TV infomercial or an ad sandwiched between segments of a radio talk show. The difference: Nobody in the audience had reason to doubt Metcalfe's observation—or its implied promise.

And Metcalfe, whose summation closed the CIO Perspectives conference "The CIO and Cyberspace: The Business/Technology Intersection,"

wasn't alone in extolling potential commercial opportunities online at the three-day conference in Naples, Fla. "The Internet's the new medium for the exchange of ideas," said David King, vice president of DDB Needham Interactive Communications, to the audience of 600 in his address on World Wide Web marketing.

"It's a unique medium for one-on-one interaction," King said. The Internet, he said, is independent, self-managed, open, constant, dynamic, immediate—"both a vehicle and a destination, an entity and a mind-set."

Those characteristics make the Web ideal for marketers to move beyond one-way messaging into creating communities where users can work and play, learn and communicate. "Smart marketers understand that the Internet's value lies in being a content provider rather than being a commercial advertiser," said King, whose agency created the highly interactive Pepsi Cola Co.'s Pepsi

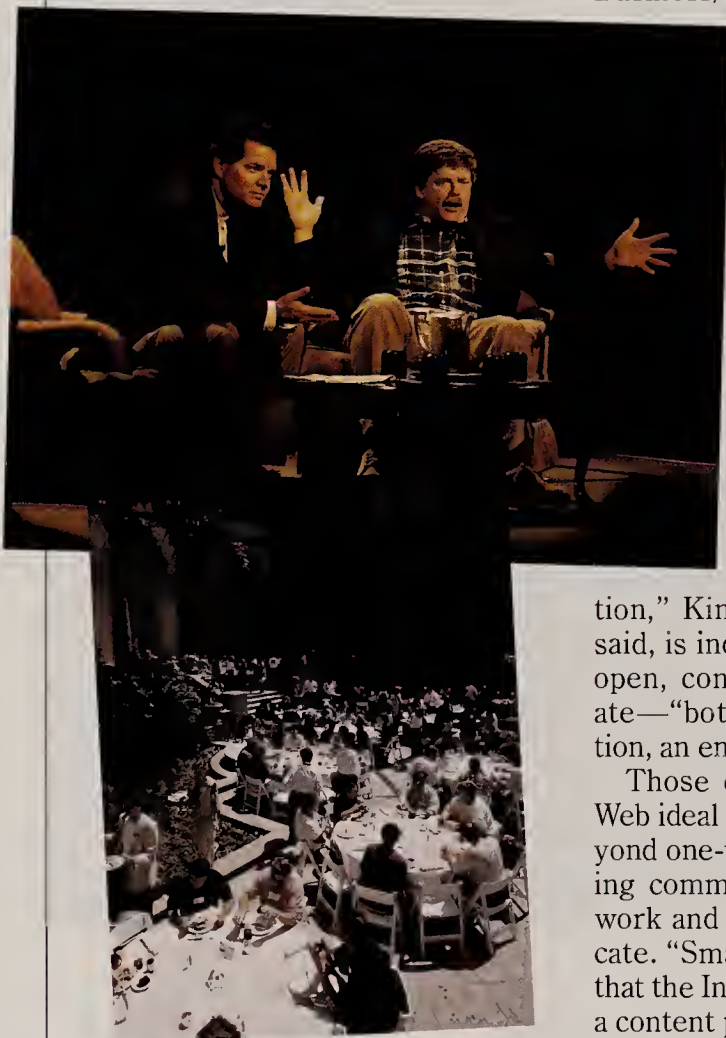
World site (<http://www.pepsi.com>).

The Atlanta Committee for the Olympic Games kept this lesson in mind in establishing a Web site for the upcoming centennial event, deputy managing director of communications Donna Jonsson told the conference. The site (<http://www.atlanta.olympic.org>) handles everything related to the games, whether it's tracking the hand-carried Olympic torch on its 15,000-mile journey from Greece or letting virtual visitors create custom programs for events they'll watch on TV. Jonsson said officials hope such applications help cyberspace visitors view the Web site as the official source of Olympic information as well as "the closest thing to being there."

Meredith Corp., a publishing company in Des Moines, Iowa, started with a different goal in mind for its @gricuture Online web site (<http://www.agriculture.com>), which serves as a clearinghouse for farming information on the Net. William Crowell, Meredith staff vice president and CIO, said the company envisioned a site that offered more than an electronic replica of the print product on which it was based, *Successful Farming*. He attributed the self-supporting site's success to good timing. "As with any market, part of capturing it is being first," Crowell said. "When people think of farming or agriculture online, they think of ag.com."

But being first doesn't always mean being the best, cautioned Alan Kay, Apple Fellow at Apple Computer Inc. and one of the researchers from the Xerox Corp.'s original Palo Alto Research Center. Kay said one of his gripes about emerging technologies (both related and unrelated to the Net) is that people accept flawed first versions of products because they don't know any better.

"The real problem with bad stan-



JIM WETHERBE and TOM DAVENPORT field questions in a session; participants lunch at the Ritz's outdoor plaza.



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dards is that accepting them can really set you back," Kay said, citing Microsoft Corp.'s MS-DOS as an example. "If people embrace mediocre technologies, things slow down a decade." In predicting the future of technology, Kay described a shift from personal to "intimate" computing, marked by more portable and powerful machines and reflecting technology's increasing ability to accommodate people's wants.

Thinking about what people want and how to give it to them is a big part of being a corporate webmaster, according to Tim Horgan, who fills that role for *CIO* and *WebMaster*. "If you are the webmaster, you need to keep your finger on the pulse of the organization," Horgan said in his presentation on developing intranets, or internal Web sites. "You can't just put [an intranet] out there and expect it to succeed. The Web team has to nurture it and take care of it." (See Horgan's online seminars in the Webmaster's Notebook on the *CIO* site <http://www.cio.com/WebMaster/seminars.html>.)

Citing the need for webmasters to be "evangelists," Horgan stressed that Web efforts need strong leaders and cross-functional support. He also listed tips to foster intranet development, including creating shared pages and offering templates that covertly build in organizational standards.

Creating organizational standards has proved to be a huge barrier to Internet use for government agencies, which must be able not only to spread technologies across different agencies

of government but to establish EDI standards compatible with their vendors' products as well. Representatives from various government agencies

outlined changes in the government's service delivery and vendor transactions based on President Clinton's call for increased computerization. Pilot projects underway include an EDI-based electronic commerce



CIOs FROM a cross-section of companies and regions were able to network.

system, business-quality e-mail and electronic travel expense processing. Future programs will target delivery of services directly to citizens, an improvement officials hope will break down perceived divisions between state and federal governments.

"In the future when citizens access information, whether it is through a kiosk or computer, they won't care which level of government is providing the service," said Ron Piasecki, deputy commissioner with the General Services Administration's Office of Emerging Technology. "They just will care about the [service itself]."

The government isn't the only entity in need of a shake-up, according to conference moderator Jim Wetherbe, director of the Center for Cycle-Time Research at the University of Memphis in Tennessee and director of the MIS Research Center at the University of Minnesota. Wetherbe said organizations must "rewire leadership," shifting from a model of patriarchy to a model of partnership. Like the Internet itself, he said, the partnership model emphasizes open dialogue, trust, cooperation, sharing of information and freedom from control.

Thomas H. Davenport, director of the Information Systems Management Program at the University of Texas at Austin and columnist for *CIO*, urged executives to transform their enterprises into organizations "where everybody is a knowledge worker." Companies should create "webs of knowledge" linking con-

tent, people, culture and organizational structure. And to oversee the effort, they may need a new type of executive, perhaps an IT executive known as Chief Knowledge Officer or a human resources specialist who might be called the Chief Learning Officer. (See "The CKO and Beyond," *CIO*, April 1, 1996.)

Many speakers said the road to riches is dotted with potholes. Metcalfe predicted that the Internet will temporarily collapse under its own weight:

"It's not dying, but it's bogging down, and it's getting worse every day." He summed up law firm Brown Raysman Millstein LLP's managing partner Peter Brown's cautions about copyrights, lawsuits, trademarks, patents and other intellectual-property issues in four words: "You need legal advice."

Even the most successful Internet pioneers have hit roadblocks.

"Cyberspace is like no other space I've tried to navigate," said Michael Eaton, CIO at Sandia National Laboratories in Albuquerque, N.M. Despite the many benefits Sandia reaped from establishing its massive internal Web network (see *WebMaster*, November/December 1995), officials encountered far more resistance than expected when they made participation mandatory. "The cultural change is harder than adopting to the new technology tools," Eaton said.

For some CIOs present, the conference was their first plunge into the realm of cyberspace and the complex issues it raises for their businesses. For others, it was a visit to familiar territory. While CIOs have drawn criticism in some circles for seeming reluctant or hesitant to hop on the virtual bandwagon, Metcalfe said those who claim that CIOs don't "get" the Internet are sorely mistaken.

"If there's anyone who 'gets' the Internet," he said, "it's the people in this room." **CIO**

For more on the **CIO Perspectives Conference**, see the **CIO Web site** at <http://www.cio.com>.

Senior Editor Anne Stuart can be reached at astuart@cio.com. Associate Editor Cheryl Dahle can be reached at cdahle@cio.com.



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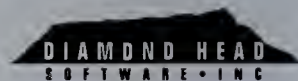
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Uneasy Pieces

Part 2

STORYLINE

Behind every hot management topic lies a pit full of snakes. Consultants, vendors and, yes, even the trade press are criticized for gleefully promoting the trend of the moment with little regard for its dark side. While it's true that many companies have reaped great rewards from their investments in knowledge management, outsourcing, customer satisfaction, benchmarking and organizational learning, success requires knowing where the dangers lie.* CIO's editors have collected a roster of pitfalls that can put at risk the manifest opportunities of these five leading management trends. You've heard the hype; now here's the fine print.

Knowledge Management

THE TRENDLINE: Quick—in 25 words or less, define knowledge management. Can't do it? You're not alone. Many managers would be hard pressed to explain, precisely and concisely, what this evolving business trend means. What they probably do know is that knowledge management has been billed as a critical tool for the 21st century corporation. They know it's the subject of a recent torrent of books, magazine articles, conferences, business school classes, World Wide Web sites and even an emerging executive position (Chief Knowledge Officer). They know that leading companies such as Swedish insurance giant Skandia Insurance Co. Ltd. and Grand Rapids, Mich., office-furniture manufacturer Steelcase Inc.

*Our first "Five Uneasy Pieces," which ran in the Dec. 15, 1993/Jan. 1, 1994, issue of CIO, looked at empowerment, total quality management, reengineering, downsizing and outsourcing (outsourcing made this year's list as well).



have launched major knowledge management initiatives. And they know it's something they just have to get too—even if they don't know exactly what it is.

The confusion is understandable. Even experts and practitioners disagree on something as fundamental as exactly what to call concerted efforts to capture, organize and share what employees know. With some semantic quibbling, you're as likely to hear such efforts referred to as managing "intellectual capital," "intellectual assets" or "knowledge resources."

Whatever it's called, proponents generally agree about why it's important. Because of downsizing, frequent job jumping, constant change, globalization and the transition from an industrial to a knowledge-based economy, they say, companies feel more pressure than ever to main-

tain a well-informed workforce, boost productivity and gain competitive advantage. By creating an inclusive, comprehensive, easily accessible organizational memory, knowledge management helps meet all those goals. But even the concept's champions acknowledge that questions continue to evolve along with the trend itself. Among them: Is it possible to manage something as intangible as knowledge? How do you determine its value? And how do the benefits fit into the balance sheet?

How it works: Knowledge management projects vary as widely as the industries undertaking them. But generally, efforts are intended to retain, analyze and organize employee expertise, making it easily available anywhere, any time—ideally and ultimately to improve the bottom line. Tools for preserving and

sharing knowledge range from newsletters to Lotus Notes, Web sites to in-house workshops, books to best practices. Some real-life examples: Skandia publishes an annual report on its intellectual capital. Arthur Andersen & Co. maintains for its consultants a proprietary Global Best Practices knowledge base CD-ROM providing a wealth of information on dozens of corporate best practices. Hughes Space & Communications Co.'s Knowledge Highway includes a lessons-learned database with hypertext links to directories of human expertise, published materials and other information.

What knowledge management promises: Proponents say effective knowledge management pays off in fewer mistakes, less redundancy, quicker problem solving, better decision making, reduced research and development costs, increased worker independence, enhanced customer relations, and improved products and services—all adding up to keep the company at least a few steps ahead of its competitors. As Leif Edvinsson, Skandia's vice president and director of intellectual capital, puts it: "There is a need to build a bridge between the old ways of doing things and the new ways. Intellectual capital is that bridge." Some specific payoffs: Skandia says its knowledge management efforts reduced the startup time for opening a corporate office in Mexico from seven years to six months, and Steelcase cites an upswing in patent applications and a threefold increase in productivity.

The pitfalls: Perhaps the toughest part about knowledge management—besides defining it—is finding what you need when you need it (see "Guiding Principles," *CIO*, July 1995). Your company's Boston team can't benefit from the comprehensive market study that the San Jose, Calif., group did in the same area two years ago if the Easterners don't know where their West Coast counterparts



stashed their report—or even that it exists. Organizations must create and maintain easy-to-use “knowledge maps” or navigational tools.

- Sloppy attempts at knowledge management can quickly escalate into serious information overload. Companies that simply stockpile data with little organization and no analysis often find that, given strains on storage space and the time wasted looking for misplaced materials, too much information is worse than none at all.

- Effective knowledge management requires creating a supportive, collaborative culture and eliminating traditional rivalries. For some employees, that may mean painfully “unlearning” long-standing lessons. Someone who interprets the old axiom “Knowledge is power” to mean “To stay strong, I’ve got to hide and protect what I know” isn’t likely to embrace the concept of sharing resources.

- Successful efforts leave no room for inconsistency, inaccessibility or isolated islands of expertise. Knowledge management becomes a parody, a source of bitter internal conflict, if the resources aren’t equally accessible enterprisewide, in every department and all remote locations, 24 hours a day.

- Knowledge does not live by IT alone. Even the most user-friendly tools won’t help much with managing information unless they’re strongly linked to people and processes, says Thomas H. Davenport, director of the Information Systems Management Program at the University of Texas at Austin and columnist for *CIO*. “Knowledge dies when it is disembodied.” By way of example, Davenport describes an engineering and construction company’s attempt

to preserve its best-practices expertise. The effort failed largely because nobody edited the materials for consistency or relevancy, and those who contributed information didn’t include their names, so nobody knew where to turn with questions.

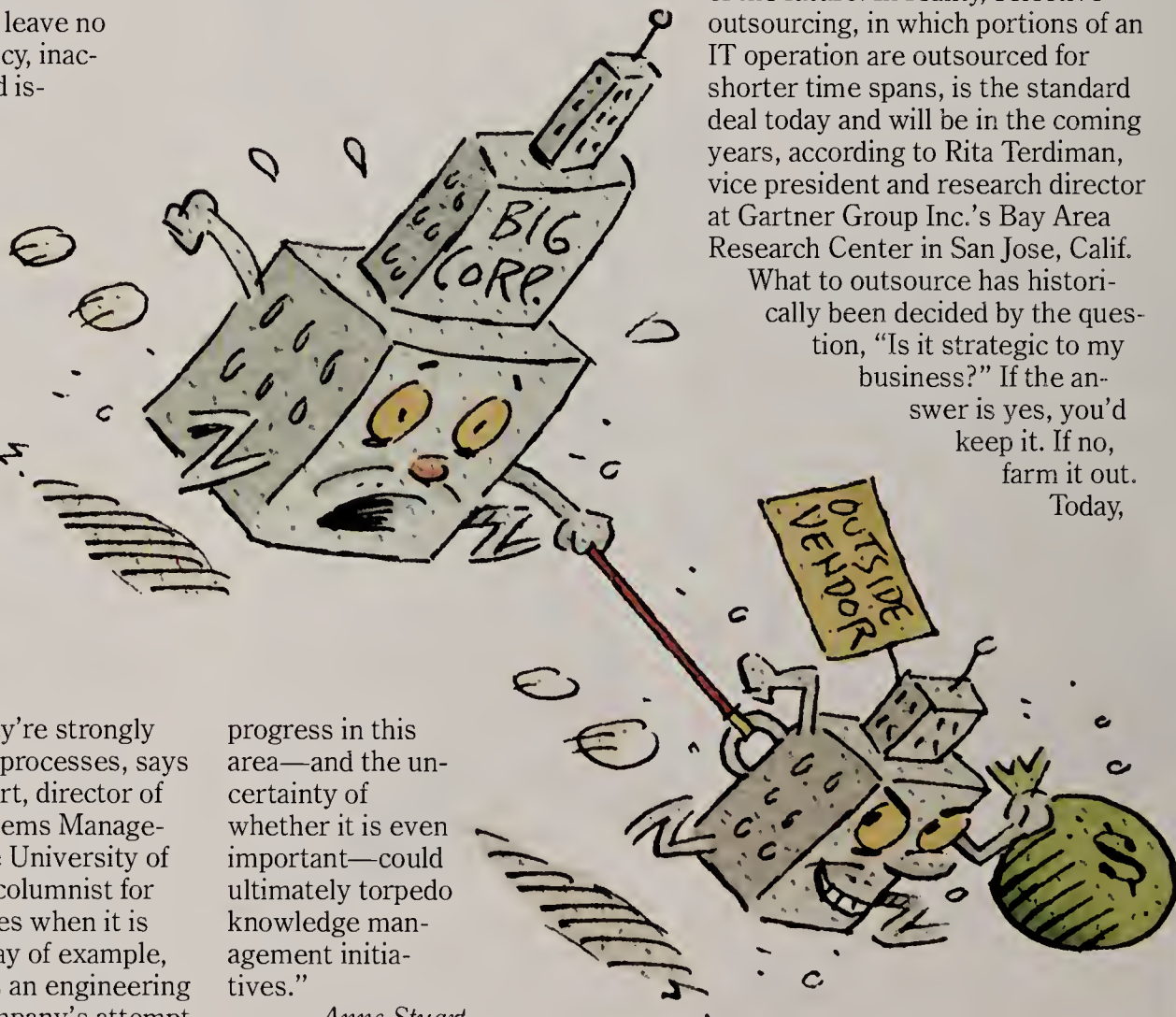
- Finally, it’s tough to translate results to the bottom line. Of 80 corporations surveyed by Arthur Andersen during a 1995 knowledge conference (see “Elusive Assets,” *CIO*, Nov. 15, 1995), more than three-quarters called knowledge management an essential or important part of their business strategy. But more than 90 percent admitted they hadn’t yet developed reliable ways to link knowledge management to financial results. “While companies may be starting to measure knowledge assets, the link to financial results remains fuzzy,” researchers concluded. “The lack of

Outsourcing

THE TRENDLINE: Outsourcing is no longer the refuge of the financially weak or technically deficient enterprise, nor is it a stick to threaten an errant IS department. It has become an accepted strategic tool of corporate America. Organizations with benchmark IS operations, such as Xerox Corp., are taking the plunge. But as with any business practice that has joined the mainstream, there’s a danger that decision makers will overlook the pitfalls and take the conventional wisdom of outsourcing for granted.

Despite the pervasiveness of outsourcing, megadeals continue to grab headlines: “Major Company X Outsources Whole Shebang to Big Vendor Y for 10 Years and \$500 Million!” The volume of these deals ebbs and flows (we are now in a peak), but they will not be the wave of the future. In reality, selective outsourcing, in which portions of an IT operation are outsourced for shorter time spans, is the standard deal today and will be in the coming years, according to Rita Terdiman, vice president and research director at Gartner Group Inc.’s Bay Area Research Center in San Jose, Calif.

What to outsource has historically been decided by the question, “Is it strategic to my business?” If the answer is yes, you’d keep it. If no, farm it out. Today,



progress in this area—and the uncertainty of whether it is even important—could ultimately torpedo knowledge management initiatives.”

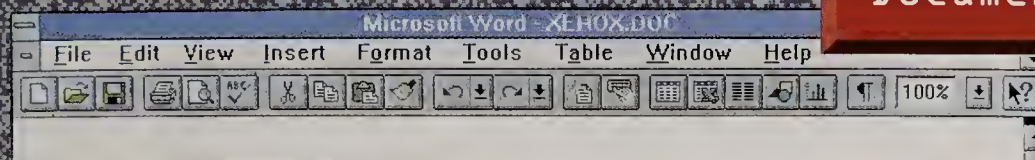
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companies are asking a different question: Is it my core competency? If no, then it's ripe for outsourcing, whether it's "strategic" or not. For that reason, organizations are more likely to outsource application development, a function considered sacrosanct just a couple of years ago.

How it works: Outsourcing, according to Gartner Group's definition, is a contractual relationship with an outside vendor to assume responsibility for one or more IT functions. It is usually characterized by the transfer of assets (facilities, staff, hardware) and can include data centers, wide area networks, application development and maintenance functions, end-user computing and business processes.

What outsourcing promises: Traditionally, cost reduction has been the overwhelming motivation and perceived payback for outsourcing. Today, cost reduction still tops many priority lists, but the goal of "strategic value" has grown to rival it. Such value can include new applications, productivity improvement, access to new technology and skill sets, and process or infrastructure redesign. Increasingly, outsourcing is viewed as a bridge solution or reprieve. For example, legacy systems will be outsourced so that in-house staff can focus on new priorities, such as migration to client/server computing.

The pitfalls: One of the main areas in which outsourcing can disappoint is in the cost reduction it delivers. A 1995 Deloitte & Touche LLP survey of 1,500 CIOs in the United States and Canada showed that only 31 percent believed that their outsourcing cost savings were significant. Sixty-nine percent were disappointed. Why the letdown?

■ Customers often think outsourcers, with their economies of scale and superior resources, can do IT dirt cheap. Business leaders anticipate 30 to 50 percent savings. In reality, such savings are rare. What's more, many contracts don't reflect changing market pricing. Market costs for hardware, software and personnel dip over time, but

fixed-price outsourcing deals stay level. As the delta widens, customers' blood begins to boil.

■ Companies that outsource are often unpleasantly surprised to find that their vendor isn't working on their projects—somebody else is. Subcontracting is a necessary nui-

sophisticated, demanding flexible contracts, performance penalties, end-user surveys, benchmarking audits and rights to approve or reject vendor personnel and subcontractors. But outsourcing remains a buyer-beware venture for several reasons. First, there are more ways

Companies that outsource are often unpleasantly surprised to find that their vendor isn't working on their projects—somebody else is.

sance in the trade because most vendors—even the biggest ones—don't have all the resources they need to provide full service. Customers complain that vendors aren't upfront about this and that subcontractors, unfamiliar with contract provisions and customer expectations, don't always deliver the required service in the expected way. One safeguard is to build subcontractor approval rights into contracts and to specify that key, mission-critical projects or systems be handled only by the primary vendor.

■ Another key pitfall, and one to which 10-year deals are highly susceptible, is scope shift. Business needs change from year to year, let alone decade to decade. It's impossible to anticipate needs several years out when negotiating an agreement. Customers can find themselves butting heads with their vendors a few years into the deal, wishing they had defined change management procedures or built flexibility amendments into the contract. A logical solution might be simply to pursue shorter-term deals, but the major vendors seem to favor longer contracts and talk customers into signing on for longer hitches than they originally intended, according to John K. Halvey, a partner and computer law expert at New York law firm Milbank, Tweed, Hadley & McCloy.

■ Over the past few years, outsourcing has become a tougher trade to ply. Customers are more

to terminate a contract, but it's still difficult to do (see "Hanging Tough," *CIO*, May 15, 1996, by Halvey and Daniel R. Mummery). Vendor liability is limited; if the outsourcer fails to perform, the customer will have trouble collecting on its losses. Above all, there is still a lot of contract ambiguity in defining services and how they are to be provided. That can come back to haunt customers when the vendor answers a request with, "Sorry, it's not in the contract."

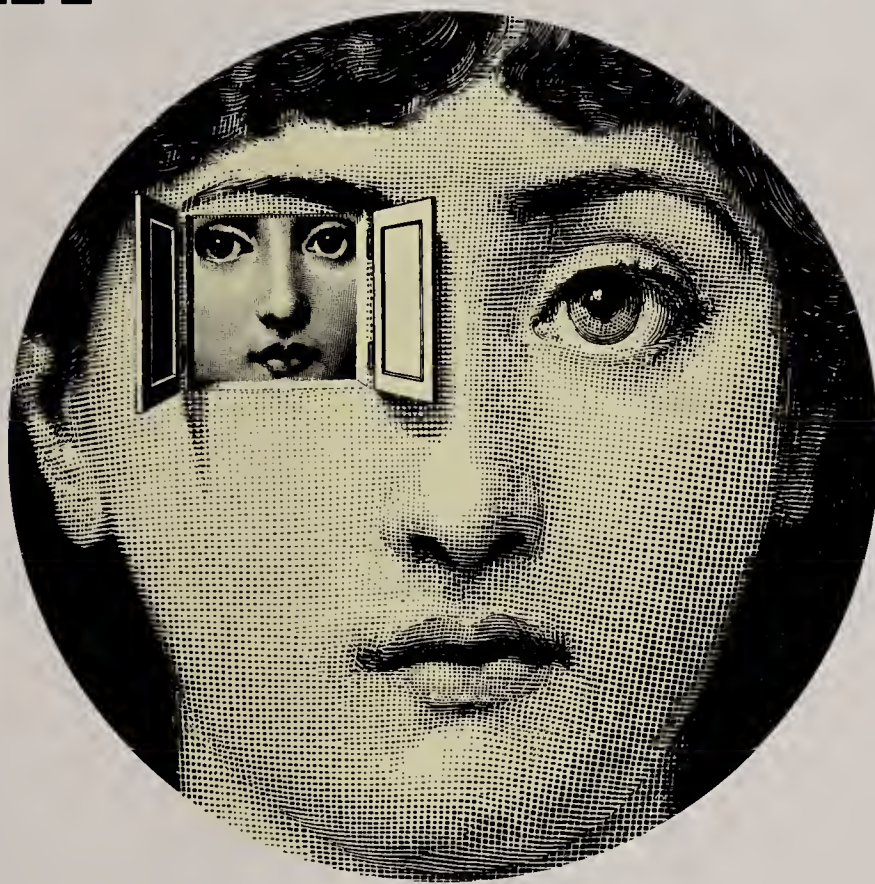
—Richard Pastore

Customer Satisfaction

THE TRENDLINE: Customer delight, raving fans, outrageous satisfaction: These sound like phrases from some EST-like seminar for salesmen, and in a way, they are. The slogans are the vanguard of American business's quest to build profits through stellar customer satisfaction—not good, not even merely great, but knock-your-socks-off, leave-'em-speechless satisfaction.

The concept has proved so popular as to render its espousal almost ubiquitous throughout the corporate landscape. Pundits such as Tom Peters and Peter Drucker tell us it's a vital business tool for an increasingly service-oriented corporate world. Other than reengineering in its heyday, the customer satisfaction movement probably has more pro-

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ponents than any other business theory around. Companies such as the Ritz-Carlton Hotel Co., John Deere & Co., United Services Automobile Association (USAA) and that

customers are taught specific skills (such as conflict resolution at USAA), that is only the beginning. Each process and function in the business is tweaked to emphasize the company's customer-centric point of view, and company executives consciously instill a culture of

sive to hook a new customer than it is to service a current one, so customer-centric firms bet that raving fans will also be loyal ones. What's more, satisfied customers will essentially act as unpaid salespeople, recommending a company to others. Leonard Schlesinger, a professor of business administration at Harvard Business School, cites data from Service Management Inter-

est Group showing that 92 percent of satisfied customers will spread the good word about a company. To produce these apostles, Schlesinger says, companies should strive to populate what he calls the "zone of affection," a pool of highly satisfied, highly loyal customers.



avatar of customer satisfaction, Nordstrom Inc., have built their reputations around their ability to meet, greet and (metaphorically speaking) wash the feet of every customer who walks in the door. In fact, one of the chief fables of the movement is a Nordstrom's story. As it goes, a gentleman came in with a tire that he wanted to return. The clerk raised his eyebrows just a tad because Nordstrom's does not sell tires, but he accepted the return and the customer went away happy. The moral of the story? The clerk was rewarded because he grasped the number-one tenet of customer service: A happy customer is a repeat customer; therefore, the customer is always right.

How it works: The premise behind customer satisfaction is deceptively simple. Treat the customer like gold and, in turn, he'll fill your pockets with same. But at companies that are truly serious about making the customer king, the initiative is a lot more pervasive than simply turning the org chart upside down and putting the customer at the top of the heap. While front-line employees who deal directly with

service through training and personal example.

Finally, good customer-oriented companies will gather information in the course of daily customer interaction and put it toward developing new products and improving existing ones. Tools to help this effort can include databases of customer information, intelligent agents that mine these databases looking for trends among the reams of data and intuitive tools like the Web that let users access the data easily. For ex-

The pitfalls: Many companies make the mistake of thinking of customer satisfaction as simple. In fact, it is tremendously complex and should touch almost every facet of the company. Moreover, it requires business executives to act as role models for service.

■ Customer satisfaction requires some forethought about whether the customer is, indeed, always right. Take, for example, the Nordstrom's tire story. Schlesinger, who is also senior associate dean and di-

"Why would you invest time and energy to keep lousy customers?"

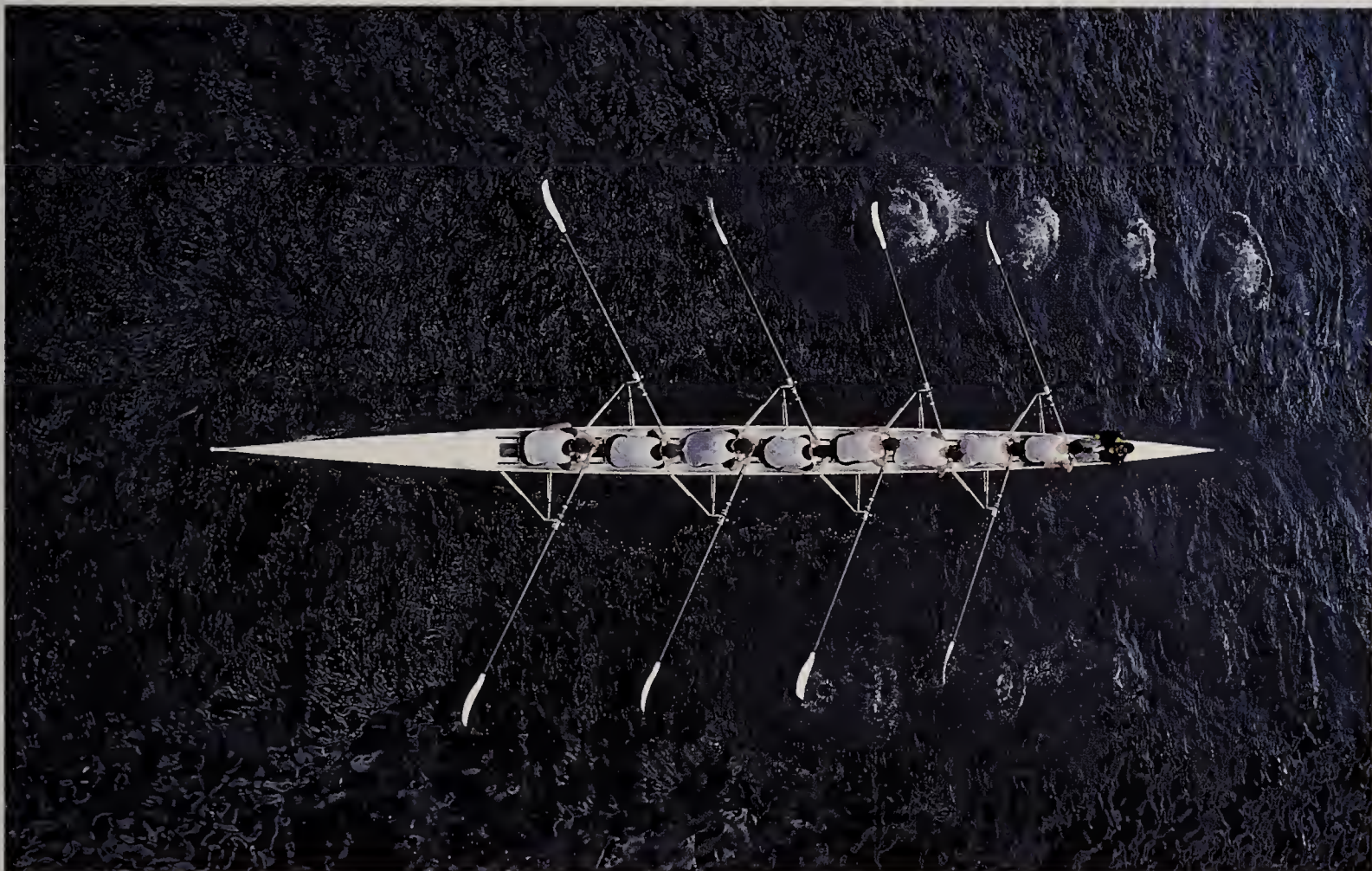
—Leonard Schlesinger

ample, Motorola Inc. Cellular Infrastructure Group makes its customer satisfaction data available on its intranet, and users can pull the raw data to create customized reports.

What customer satisfaction promises: Adherents say that good customer satisfaction practices will result in customer loyalty and that repeat business is vital to a company's bottom line. One common adage is that it's much more expen-

rector of external relations at Harvard Business School, says that the moral is not about outstanding customer service; "What you learned is that Nordstrom's is a sucker," he says. In fact, there are bad customers—people who are not interested in good service but rather low prices or convenience—and no amount of great service will ensure their loyalty, Schlesinger says. Companies need to be more precise

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about the idea of customer retention and figure out which customers are worth retaining. When you start thinking about lifetime value, "Why would you invest time and energy to keep lousy customers?" he asks.

■ A true 100 percent dedication to customer satisfaction is, in fact, a recipe for disaster, points out Stuart Macdonald, a fellow at the Warwick Business School Research Bureau at the University of Warwick in Coventry, England. In "Too Close for Comfort? The Pitfalls of Getting Close to the Customer," an article in the Summer 1995 *California Management Review*, Macdonald points out the unfortunate consequences of customer satisfaction practices carried to an extreme. Think about it: What would completely satisfy a customer? Giving items away would probably do it. "Rare is the more sober conclusion that the achievement of complete customer satisfaction is, in the long run, a reasonably sure route to bankruptcy," Macdonald writes.

■ Senior executive commitment to excellent service is not enough.

The value of it must be communicated clearly throughout the company and to the front lines if it is ever to reach the customer.

Schlesinger cites more Service Management Interest Group numbers:

While 92 percent of CEOs regard service quality as extremely important, and only 51 percent think the same about short-term financial results, that attitude does not continue down the food chain. When it comes to branch manager priorities, hitting plan becomes of paramount importance, with customer service trailing a sad fifth in priority. The message, says Schlesinger, is that "the troops are only going to do what the boss checks up on." If executives fail to make the importance of customer satisfaction clear, it will receive

short shrift at the front lines.

■ Finally, if you want to keep your customers, be good to your employees. There is a direct link between employee job satisfaction and customer satisfaction, says Schlesinger. What customers want most of all is a reliable relationship with a company, and they get that from the people who work there. A revolving door on the customer service representative's office is hardly the way to achieve that.

—Carol Hildebrand

Benchmarking

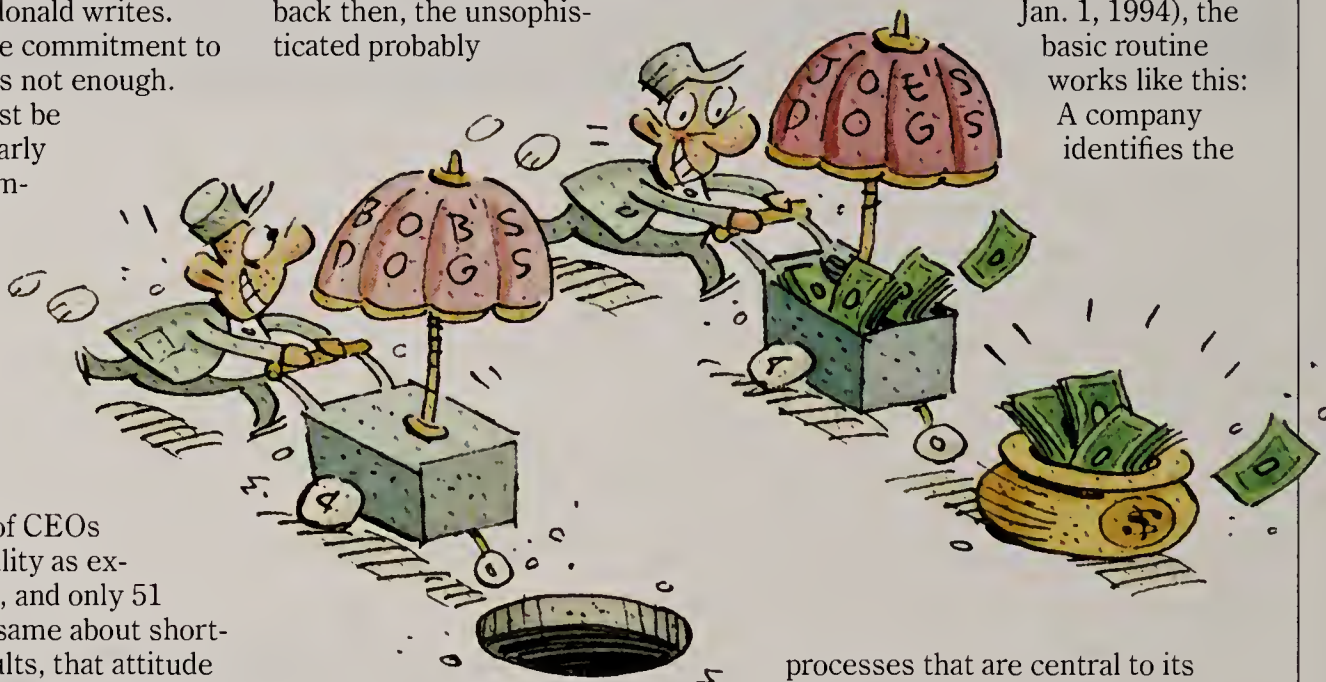
THE TRENDLINE: Before benchmarking became Benchmarking, it was just a shrug of common sense. Of course the best way to learn is by watching others. The legendary Henry Ford, for example, gleaned tips for his car assembly line by observing production methods in a Chicago slaughterhouse. Way back then, the unsophisticated probably

reasons it should (or shouldn't) be done and how to apply what is learned has led many companies to an "everybody else is doing it and so should we" mentality. For others, it has become a substitute for in-depth thinking about their business and goals: I benchmark, therefore I must have a strategic clue.

That attitude has been aided by the emphasis that competitions, most notably the Malcolm Baldrige National Quality Award, put on doing and measuring instead of learning. According to the American Productivity & Quality Center's International Benchmarking Clearinghouse (IBC), 55 percent of the criteria for the Baldrige award relate to benchmarking and best practices.

How it works: Benchmarking is implemented in a variety of ways. But depending on whether it is outsourced or coupled with other initiatives such as reengineering (see "Five Uneasy Pieces"

CIO, Dec. 15, 1993/Jan. 1, 1994), the basic routine works like this: A company identifies the



just called it a good idea. In the '80s, Big Business dressed it up and gave it a good haircut and a catchy name. As is the case with all buzzwords, the handle now stands in for the idea it was coined to describe.

As benchmarking has progressed from fad to fixture, the preoccupation with its practice rather than the

processes that are central to its business and then selects the top-performing companies in those areas. By analyzing how that excellence is achieved, the company learns lessons to apply to its own processes.

What benchmarking promises: Benchmarking can deliver significant performance improvements and returns based on efficiency, cost savings and new revenues. Bench-

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marking projects typically target cycle times, productivity, customer service, quality and production costs. They also can be part of an effort to shift the culture of a company to be more customer-oriented and results-focused.

The pitfalls: Many companies make the mistake of letting the process of benchmarking become an end in itself. This is most common in corporate settings where special full-time benchmarking teams are established, says Eileen C. Shapiro, author of *Fad Surfing in the Boardroom: Reclaiming the Courage to Manage in the Age of Instant Answers* (Addison-Wesley Publishing Co., 1995). "You end up with these people who travel to the most fascinating countries and companies and know all sorts of stuff, and there is absolutely no way to figure out how this knowledge applies to their own company," Shapiro says. "You really just create this elite club of frequent flyers."

■ Getting lost in the process obscures the point of benchmarking:

■ Companies can become preoccupied with the measure, whether it's a satisfaction rating or time-to-market statistic, rather than paying attention to the processes that produce those metrics. The goal becomes not to improve process but to match the best practices at any cost.

■ The key element in benchmarking is the adaptation of a best practice to tailor it to a company's needs and culture. Without that step, a company merely apes another company's process. "What happens with these fads is that people get lazy," Shapiro says. "Instead of saying, 'Federal Express is a brilliant company; let's understand better what they do and build on it and figure out whether it applies to us,' they say, 'Let's try to be Federal Express.' It's a monkey-see, monkey-do kind of thing." This approach condemns benchmarking to fail because many best practices are as much a function of a company's culture and unique characteristics as they are of process.

■ Benchmarking can become an un-

"The company was more committed to winning awards than serving the customer."

—Alan Weiss

performance improvement. For example, Florida Power & Light Co. received the Deming Prize in 1989 for its benchmarking excellence. Later that same year, a new CEO came in and dismantled large portions of the company because its structure was geared toward excessive benchmarking. "He found the company was more committed to winning awards than serving the customer," says Alan Weiss, president of Summit Consulting Inc. in East Greenwich, R.I., and author of *Our Emperors Have No Clothes* (Career Press Inc., 1995). That kind of loss of focus is less likely to occur if benchmarking is an integral part of the jobs of line managers, who have other responsibilities and are more inclined to seek practical applications.

due burden on staff time and company resources. Although return on investment is not the only goal of benchmarking, only half of the top benchmarking companies surveyed by the IBC keep track of their financial results. Some companies tout returns in the millions, but it is unclear how consistently benchmarking delivers on this count.

■ Companies often waste time benchmarking noncritical functions or struggling to raise the performance bar an insignificant amount. Does it really matter to your customers if you shrink your delivery time by two days? If you deliver packages, yes. If you deliver antiques, maybe not. And how much does it cost to cut out those days?

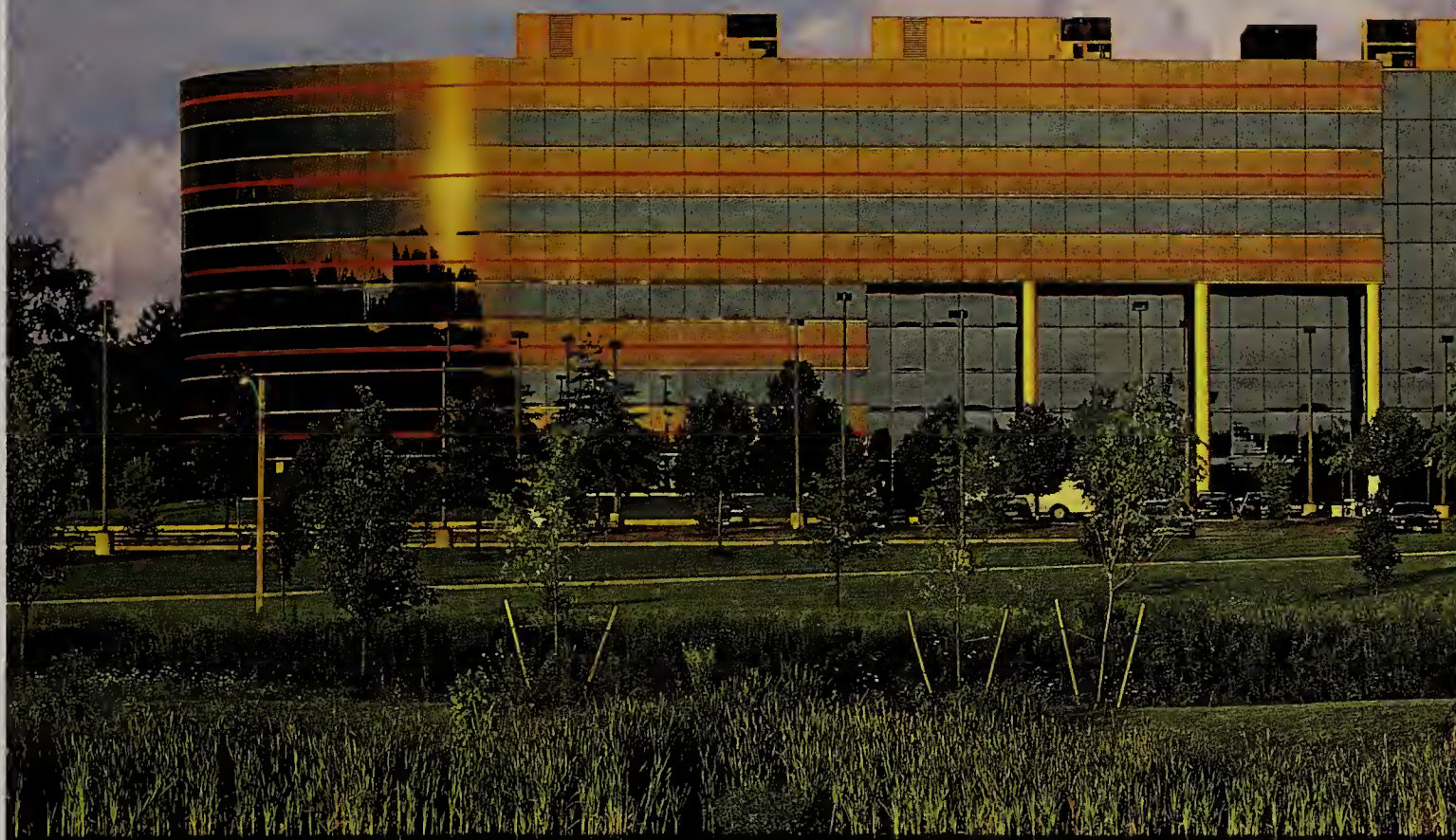
—Cheryl Dahle

The Learning Organization

THE TRENDLINE: Becoming a learning organization provides the most effective framework for maneuvering through tumultuous times, proponents contend. In his seminal book, *The Fifth Discipline: The Art & Practice of the Learning Organization*, first published in 1990, Peter M. Senge, director of the Systems Thinking and Organizational Learning Program at MIT's Sloan School of Management and a founding partner of Innovation Associates in Framingham, Mass., defines a learning organization as one "where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free and where people are continually learning how to learn together."

A true learning organization is one that can create its own future by proactively seeking out and mastering change. Leaders of learning organizations are adept at communicating a shared vision and helping others gain accurate views of reality. Such well-known organizations as AT&T Corp., Intel Corp., EDS Corp., Herman Miller Inc., Ford Motor Co., National Semiconductor Corp. and Merck & Co. Inc. are exploring learning organization practices as members of MIT's Center for Organizational Learning (COL), in Cambridge, Mass.

How it works: Becoming a successful learning organization requires a collective mind shift. After all, the argument goes, transforming an organization is possible only after individuals are transformed. People who can see the world as a large system of interrelated parts, who have strong, clear visions of the future and are able to achieve the results they really want (a quality Senge refers to as personal mastery) are characteristic of those in a learning organization. They are impassioned about their work and committed to helping their organization achieve its vision. Such people learn from their mistakes and



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What the learning organization promises: By looking at problems systematically, organizations avoid the blame game and finger pointing that typically leads to quick-fix solutions. Employees are encouraged to learn and participate, and their contributions are valued. They realize their full potential because they are no longer shackled by functional barriers, historical biases or hierarchical management structures.

facturing costs are relatively easy for an organization to get its hands around. But getting a handle on whether employee learning is enhanced is a bear. At best, the process

quest to be the best in the chip business. If learning initiatives are adopted simply for the sake of learning, employees will soon become cynical and management credibility

Learning is a function of the systems, structures and processes within a company. As a result, organizations have to change everything that reinforces old behaviors.

- Organizations that launch initiatives with the goal of becoming a “learning organization” are likely to

■ Learning initiatives often require sweeping changes throughout the organization. Yet there's a danger that any learning program—simply because it requires so much hard work to implement—can become marginalized to small pockets of the company.

Otherwise, serious fissures can appear between nonbelievers and faithful followers.

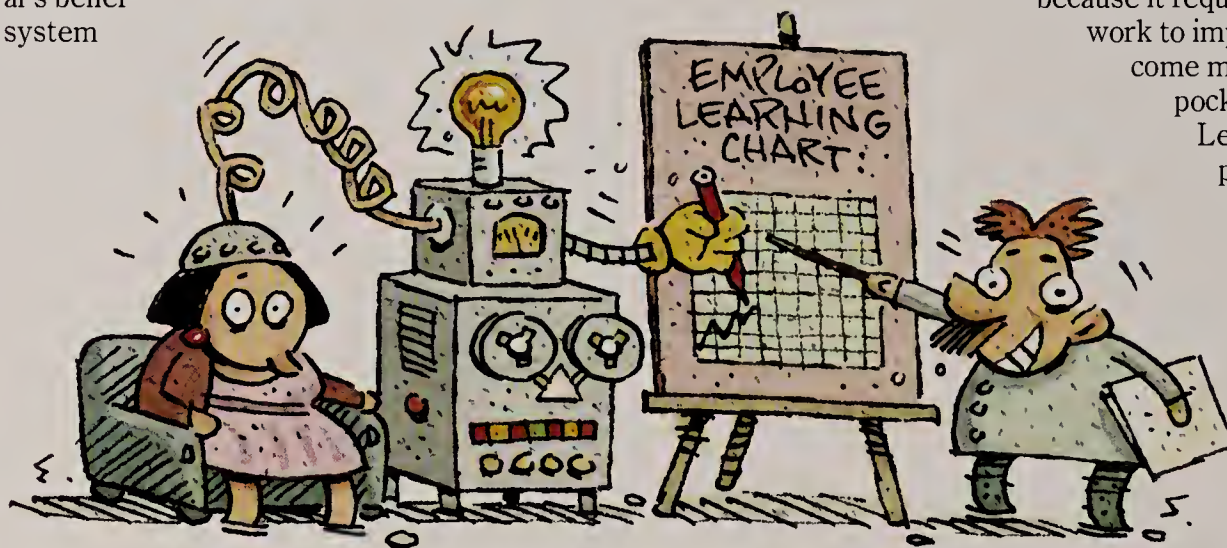
■ There are as yet no foolproof ways to measure how effective—or ineffective—learning initiatives may be. In fact, according to Senge, traditional measures such as profits may actually be off at first because learning organizations should not focus on short-term solutions. Jeff Clanon, executive director of MIT's COL, says companies have to take heed of both the quantitative and qualitative impact of learning. Criteria such as time to market or manu-

creates an “us versus them” atmosphere that rarely promotes anything productive.

■ Successful learning is also a function of the systems, structures and processes within a company. As a result, organizations have to change everything that reinforces old behaviors and patterns of thinking. Organizational systems and individual training and development must be linked together; paying attention to either one in isolation will undermine the overall effort of any learning initiative.

—Megan Santosus

—Megan Santosus





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—ANNE GRIM



Mining the **Possibilities**

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HAVE YOU SEEN THE credit card adorned with a reproduction of Winslow Homer's "Boys in a Pasture"? How about the one that promises to help save the rainforest? Or the one that lets you earn free goodies from Toys "R" Us? Welcome to the bank card phenomenon of the 1990s—co-branding.

Like never before, traditional banking and credit institutions are teaming up with retailers, nonprofit organizations, airlines, gas companies and automobile manufacturers to offer consumers a new breed of credit card, one that gives them something back. Because they are intent on racking up points for travel, hardware items or donations to their favorite charitable institutions, "consumers use a co-branded card differently than they use a regular credit card," explains Anne Grim, senior vice president of global information services at MasterCard International Inc. in Purchase, N.Y. "They treat it as a different financial vehicle, and

they use it in places where they never used a card before."

Lending banks looking for leverage in an increasingly cutthroat and competitive market were, by the end of 1994, clamoring for access to data on purchasing trends to develop special offers and to analyze the new purchasing patterns spawned by this type of precision marketing. "In such a competitive environment, with big guys

and little guys all going after the same [credit card] customers, those who are going to win in the long term are the ones who can adapt very quickly to changing patterns in customer behavior," says Ronald Zebeck, president of Fingerhut Financial Services Corp., which offers its own branded MasterCard to consumers. (Fingerhut Financial

is a subsidiary of Fingerhut Companies Inc., a retail and direct marketing corporation in Minnetonka, Minn.)

But MasterCard's core transaction-processing systems weren't built to support data mining and certainly weren't available for end-user banks to access directly. With 22,000 member financial in-



BY TRACY MAYOR

stitutions, some 452 million credit and debit cards in circulation and more than 13 million acceptance locations, MasterCard's IBM Corp. and NCR Corp. mainframes were already plenty busy processing requests for approval from merchants' banks and linking those requests to MasterCard member banks that issue cards to consumers. When member banks wanted information on the purchasing patterns of their cardholders, they had to request a report from MasterCard. Some information was simply unavailable. Other data had to be culled from several systems and prepared by internal staff, and that process could take days or even longer and resulted in static, rather than dynamic, data. The company needed to develop a new system, and fast.

So, in the spring of 1995, MasterCard International embarked on an ambitious plan to build from scratch a data warehouse that could deliver purchasing data to the desktop at member banks. After securing top management's approval for the project, MasterCard rolled out the new service within a self-imposed (and, some might say, Draconian) deadline of five months. In just 150 days, the development team brought in vendors to develop various components of the system; built and populated a brand-new warehouse for one terabyte of data culled from MasterCard's transaction processing systems; integrated an end-user front end; and tested, debugged and delivered the service in beta to its first group of customers.

THE RESULT OF MasterCard's efforts was Market Advisor, a data mining service that lets member banks recognize spending patterns, uncover opportunities for special offers by identifying unusual cardholder activity, compare the performance of their cards against that of comparable lenders and more accurately track response to promotions. Market Advisor gives a competitive edge to its member banks, and it helps MasterCard move beyond merely offering transaction processing services to become an informa-



"IN SUCH A COMPETITIVE ENVIRONMENT, WITH BIG GUYS AND LITTLE GUYS ALL GOING AFTER THE SAME CREDIT CARD CUSTOMERS, THOSE WHO ARE GOING TO WIN IN THE LONG TERM ARE THE ONES WHO CAN ADAPT VERY QUICKLY TO CHANGING PATTERNS IN CUSTOMER BEHAVIOR."

—RONALD ZEBECK

tion provider. "There is an improved relationship between MasterCard and our partners when we're perceived as the most technologically advanced," says Grim.

The new service is part of a trio of fee-based services that are accessed through MasterCard Online, an umbrella platform that features a graphical, point-and-click front end that runs on client workstations; security; support for standard e-mail protocols; and file transfer protocol telecommunications software that provides dial-up access to MasterCard's processing center in St. Louis and to multiple application servers around the globe. Users dial in to MasterCard Online, and the server directs them to one of the three services—Market Advisor, the data mining tool for competitive analysis; Portfolio, a service that provides each member bank and merchant bank with a complete picture of its

overall credit card business; and Match, an updated, real-time version of MasterCard's fraud detection system that runs off the company's transaction processing computers.

With Market Advisor, Fingerhut and MasterCard's other member banks can drill up or down on defined levels of data, sort and filter data according to predefined criteria, and use custom calculations to identify specific groups of spenders. Partners can analyze purchasing trends by merchant categories, geographic location or card performance and benchmark against other lenders' performance.

For Fingerhut Financial, Market Advisor serves two essential purposes, says Zebeck. First, it allows the company to increase efficiency and eliminate waste by offering promotions only to customers who are likely to be interested in them. "We want to avoid sending stuff about cars to people who live in Manhat-

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Whether it's gold, platinum or run-of-the-mill, a credit card says a lot about its owner. Now that banks have access to live data on purchasing trends, are cards saying more than customers want them to?

Say you travel to Manhattan on business several times a month and use your MasterCard whenever you entertain clients. You rotate between two or three tried-and-true upscale restaurants, but, truth be told, you're getting a little sick of Le Cirque. Just when you think you can't eat another plate of cilantro-crusted salmon, along comes an offer in the mail—10 percent off any meal you order at one of several new midtown restaurants, all in the same general price range you're accustomed to. Armed with this economic incentive, you set off with your best customer in tow to try a new eatery.

Many cardholders would probably view such an offer as being in their best interest. But what if the situation were a little different—what if you were purchasing medical supplies? Adult reading material? Psychiatric services?

Privacy concerns have been around as long as credit cards themselves, but new and extremely powerful services like MasterCard's Market Advisor have the potential to sound new alarms. One concern is simply the degree of data distribution: At one time, only MasterCard International had access to data on purchasing patterns; now, it's theoretically possible for all 22,000 card



issuers to access the same data. Another concern is the quality of data now available—it's live, on an individual account level and broken down by merchant. In other words, individual banks now have the capability to determine who bought what, when and where.

There are a number of checks and balances built into the system to ensure cardholder privacy, says Anne Grim, senior vice president of global information services at MasterCard. Seven layers of security in the communications middleware of MasterCard's data warehouse prevent unauthorized use of the system and restrict member banks in the type of data they can access and the ways they can combine data.

Most important to cardholders is

that MasterCard International itself handles transactions by account number only. Cardholders' names and addresses do not appear anywhere in the MasterCard databases, and users are prevented from searching on individual account numbers. "You can't go in and say, 'Show me everything Joe Smith bought,'" says Grim. "The system is designed to show trends and spending patterns to our member banks, not individual accounts." Account data, identified by number only, isn't matched up to individual names and addresses until it reaches the member banks, which keep that data in a separate system.

Still, the end result of all this data mining is a list of account numbers of people who have, for example, purchased cars recently, used their MasterCard at the movies or charged more than \$150 at hardware stores. From there, a bank needs only to match that list of account numbers with its list of cardholder names and addresses to produce an instant targeted mailing of people who fit a certain spending profile.

If that situation makes you nervous, take heart in the fact that the information is considered private between you and the institution that issued your charge card. "That information is not being given to someone else, so privacy concerns are mitigated," says Ronald Zebeck, president of Fingerhut Financial Services Corp.

More to the point, he says, many consumers welcome offers that pertain directly to what they are most likely to purchase with their charge cards. "Given the competitiveness of the marketplace, the benefit to the consumer is positive." —T. Mayor

tan," he says. And second, it helps retain customers by enabling Fingerhut to present them with relevant, timely offers. "If we identify customers that have made a lot of television-related purchases, we can offer them a 5 percent rebate if they buy a large appliance, like a television, within a certain amount of

time," says Zebeck. "With attrition rates in the double digits, even lowering that rate by two or three points is an accomplishment."

MasterCard succeeded in its efforts in such a short amount of time because it built a data warehouse for all the right reasons. "What drives a data warehouse is competition, the

search for new business opportunities," says Neil Mendelson, senior director for data warehousing at Oracle Corp. in Redwood Shores, Calif. "This is not reengineering. This is not about doing more for less; it's about doing more." Data warehouses work best when they are attached to a specific business objective and de-

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GOOD JOB OF
DETERMINING
WHAT THE
CO-BRANDING
PARTNERS
NEEDED."
—ROB REEG**

finable goals, Mendelson says. "The objective was not to warehouse a whole bunch of data and then find out what to do with it. MasterCard started with something it thought was manageable and did it in a fixed amount of time."

MASTERCARD MADE the project manageable by following a master plan that could have come straight from an MBA textbook and, as Grim says, by putting in "lots and lots of overtime." The global information services group began the process by developing a clearly defined, highly specific set of business requirements and by getting all parties involved to agree on the deadline in advance. Next, a small group of executives from both the business and IT sides of the company identified technology able to fit together easily into a seamless system, from front end to back room, and chose vendors with proven track records for handling large databases and a willingness to work in cooperative, intracompany groups.

Selecting the database was one of the earliest steps in the development process, says Rob Reeg, senior vice president of systems development

for MasterCard, and Oracle immediately came to the forefront. MasterCard had recently conducted a study of virtually every third-party database, and Oracle was recommended as the company's database of choice. For the data warehouse project, "we chose Oracle for its corporate expertise and the functionality that it brings to the table," says Reeg.

Picking out a front end—a crucial piece since ease-of-use could make or break the success of the service in the field—was more difficult, in part because there was a much vaster array of products from which to choose. The company decided on user query tools from Information Advantage Inc.'s DecisionSuite business analysis software. "We were originally looking at SQL reporting packages," says Reeg, "but Information Advantage had the abilities we wanted. It fit into our niche."

Market Advisor incorporates two of the four modules of Information Advantage's DecisionSuite line: Analysis, which MasterCard uses internally for authoring and report generation, and NewsLine, the data mining tool that represents the heart and soul of the system from the end user's perspective. NewsLine allows users to review reports and then drill down to

gain new levels of detail on certain dimensions or change parameters on the fly (for example, comparing domestic performance to that of French, then English, merchants). The software lets users send electronic alerts to one another and forward live reports, complete with all assumptions and rules, which can then be further analyzed by the recipient.

From the outset of their relationship, MasterCard made it clear that it wanted to work with Information Advantage less as a vendor and more as a business partner, says Larry Ford, president and CEO of the Minneapolis-based company. "MasterCard came up to visit in January [of 1995], and we showed them our architecture and what we had in development," says Ford. "The architecture was stable; the [ability to handle] database volume was proven. Their question was, could we get NewsLine out in time to meet their very aggressive schedule?"

In addition to obtaining feedback from MasterCard and a select group of its member banks testing the NewsLine front end as it was being developed, Information Advantage had access to MasterCard's usability labs, human-factors specialists and other developers working on the warehouse's design. "With Infor-

Technical Toolkit

Warehouse: An Oracle7 database running on an AT&T 3600 minicomputer that holds approximately one terabyte of data.

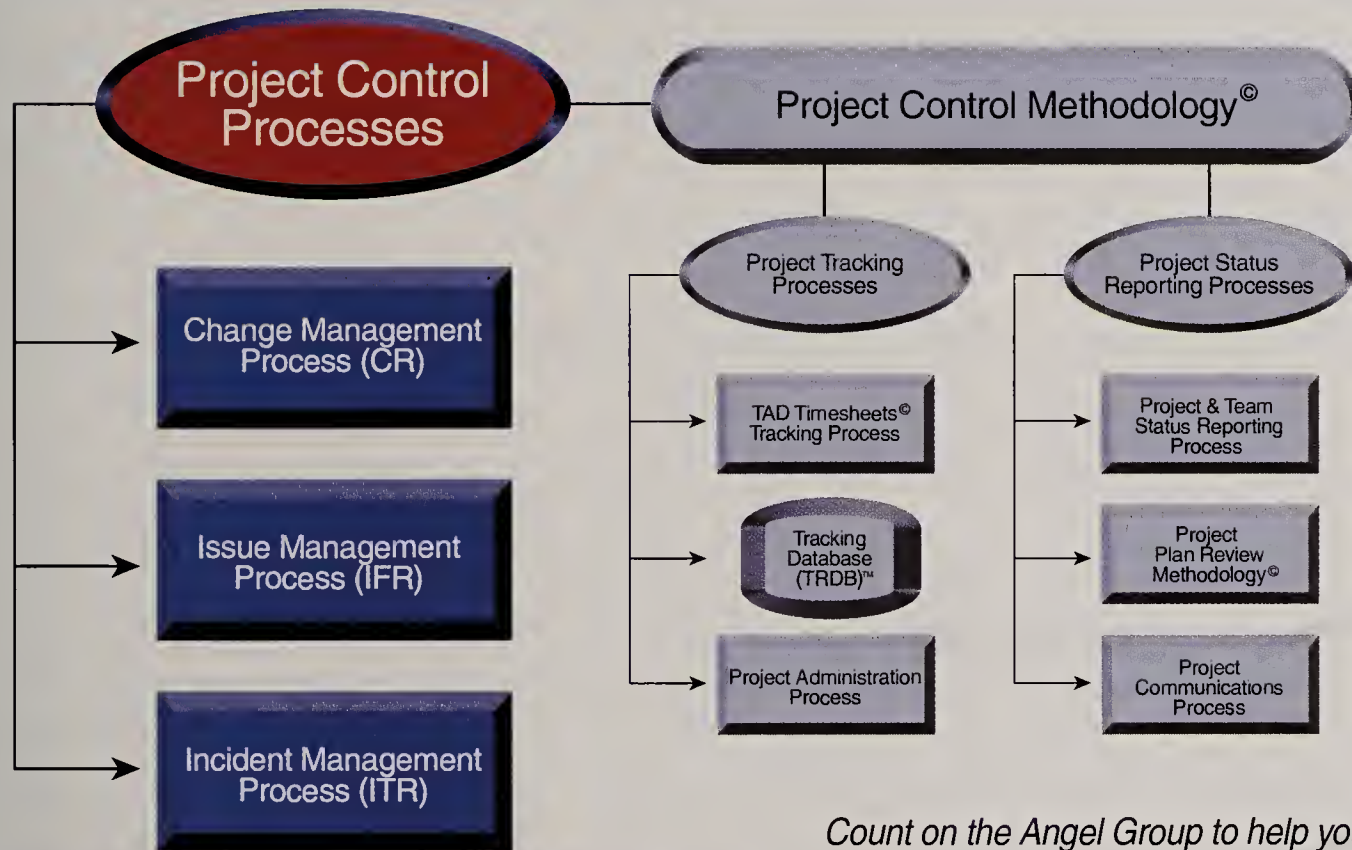
Query tools: Customized versions of Information Advantage's DecisionSuite business analysis software: Analysis (for internal authoring and report generation); and NewsLine (the data mining tool).

Desktop requirements: MasterCard recommends that its member banks access Market Advisor using a Pentium/60 processor, SVGA 15" monitor and Microsoft Windows 95 or Windows NT. They also need a minimum of 20MB of memory, 50MB of disk space and a V.34-compatible 28.8Kbps modem with data compression.

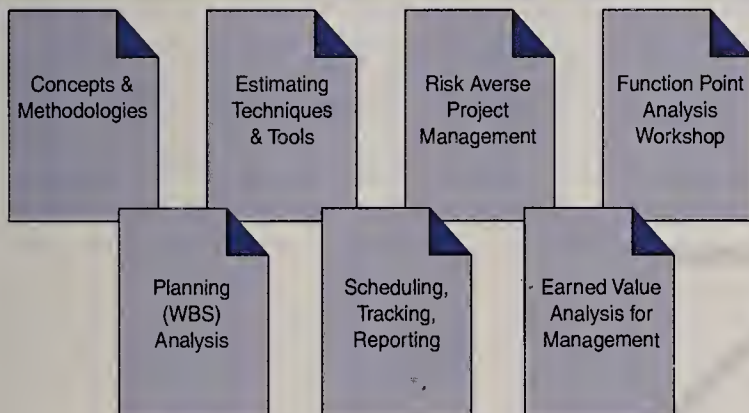
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mation Advantage, it was a case of very frequent meetings. Their product [was changed] a lot during development," Reeg says of MasterCard's partnership strategy. "With Oracle, we actually had Oracle consultants on-board working with our in-house database administrators."

"MasterCard came to Oracle in the very earliest stages of this project and treated us not as a vendor-supplier but as a partner," says Oracle's Mendelson. "We embarked with a shared set of goals and objectives rather than traditional objectives. The time frame otherwise would have been very much extended."

SUCH BUSINESS partnerships were crucial to the fast turnaround time on MasterCard's warehouse project, according to Grim and Reeg, but they would not have been possible without teamwork of a different variety—a strong internal partnership between the business and IT sides of the company. At the core of this partnership was a small group of executives, including Brantley Orrell, at that time the senior vice president of global performance and tracking and now senior vice president of global brand development; Grim from global information services, which functioned as the "business owner" of the project, in charge of marketing, distribution and deployment of MasterCard Online; and Rod Mack and Reeg from global technology and operations. (Mack, the former senior vice president of systems development, has since left MasterCard for AT&T Corp.)

From an IT perspective, development staffing for the project peaked at 17 people, including 10 to 12 programmers, four database administrators and a few data analysts, accord-

How They Did It

For a closer look at MasterCard's aggressive time line for building a data warehouse in just five months, visit CIO's Web site at http://www.cio.com/CIO/060196_master.html.

Lessons Learned

.....
MasterCard got its data warehouse off the ground in a hurry—and learned a thing or two in the process

1. BREAK THE RULES: New technology often calls for breaking business rules. At MasterCard, standard procedures dictate that new business proposals include multiyear projections for technologies and costs. But new, rapidly changing technology like a data warehouse doesn't lend itself to five-year projects—"five to nine months is more like it," says Anne Grim, MasterCard's senior vice president of global information services and the main "business owner" of the data warehouse project. The upshot for MasterCard: Following an "education process" for senior management, Grim and her staff received permission to make financial and technological projections annually for the warehouse project.

2. GET PERSONAL: When deadlines are tight, there's nothing like "face time" to move a project along. With the business owners in New York and the project developers in St. Louis, the shortest distance between the two turned out to be not a network, voice mail, or conference call, but an airplane. "With so many [development] efforts going on in parallel, there was always some interaction needed. Telephone contact just wasn't sufficient," says Grim. To make sure the project stayed on track, Grim and other members of the business team spent three days a week in St. Louis for the five months of active development on the warehouse. "There was definitely some personal wear and tear that we hadn't anticipated," she says.

3. SIZE MATTERS: A database of more than a terabyte behaves very differently than one that's a quarter of that size. As MasterCard discovered, a very large database needs performance tuning on a daily basis, says Grim.

—T. Mayor

ing to Reeg. Now that Market Advisor and Portfolio are up and running, Reeg estimates there are about nine people dedicated to ongoing maintenance and development.

Nearly everyone involved in the data warehouse project, both internally and externally, was bolstered by MasterCard's unwavering business objectives for the warehouse. "The business side did a very good job of determining what the co-branding partners needed," explains Reeg. "Then we had a series of joint sessions with IT people plus business people, and we took them and translated them into technical specifications."

"The business requirements

haven't changed in 18 months, which is pretty amazing," says Grim. "IT mapped out what data we needed and in what format we needed to see it, and then we just went from there." Such an ironclad business plan helped the team stay focused and move more quickly, Grim says. "There was room for [multiple] points of view, but everyone recognized there wasn't a lot of latitude for debate," she says. "When a decision had to be made, we said, these are the options, these are the pros and cons, now let's make a decision and move on." **CIO**

Tracy Mayor is a freelance writer and editor in Beverly, Mass. She can be reached at tmayor@shore.net.

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Logistics once had a simple formula: Manufacture products in long runs and move large quantities in as few shipments as possible. Today it's not so simple.

MOVING THE GOODS

BY PETER FABRIS

MORE THAN 10,000 BOXES containing PCs and peripherals pass daily from inventory shelves to conveyors to loading docks to trucks at Inacom Corp.'s distribution center in Omaha, Neb. To the untrained eye, the computer reseller's facility appears to be a highly efficient but unremarkable operation. The objective couldn't be simpler: take boxes off a shelf and ship them to customers. There is an unseen intelligence to this place, however, that is the key to the success of a booming company in a booming industry.

**The shorter
the cycle time,
the faster a
company can
respond to
changing market
conditions.**

For companies like Inacom, improvements in logistics functions that reap shorter cycle times, reduce inventories and result in more accurate deliveries are competitive imperatives. In a marketplace grown accustomed to overnight package deliveries, the old "allow four to six weeks for delivery" maxim just doesn't cut it anymore. As many companies revamp their logistics practices, IT and the CIO play increasingly important roles.

Inacom's transformation of its distribution strategy began in 1993, when its product offerings and order volumes had grown so fast that the company faced a serious problem. Before that, in the days of the IBM-XT, retailers bought PCs from the factory or from distributors and configured them on-site for their customers, but that procedure proved too slow for the growing business. The company needed something new.

Inacom's warehouse innovation was "a wave pick." That's not a basketball move but a strategy of filling orders in groups according to product location in the warehouse. By implementing the wave pick method, Inacom increased its productivity and accuracy. "Our

failure rates are infinitesimal," says Vice President and CIO Jeff Hartigan. For Inacom, "failure" is defined as not accurately fulfilling an order within 24 hours. Inacom today meets that mark, configuring and sending systems directly to end users in individual shipments. Although Inacom's warehouse conveyor system physically resembles an assembly line, it really acts like a waiter expediting personal delivery to each customer. With countless possible permutations for each order, including such variables as the amount of RAM, software options and multimedia add-ons, the potential for mistakes is great, but the wave pick method is supported by an automated conveyor system with built-in intelligence that delivers the right products to the loading dock at the right time (see related story, this page). Despite the difficulty inherent in such a complex order-fulfillment process, Inacom maintains its high logistics goal—accurate orders delivered in one day.

COMMON OBJECTIVES

Individual company performance requirements vary according to industry, but some common threads run through logistics functions at every organization. A universal aim is to reduce order-fulfillment cycle times. The shorter the cycle time, the faster a company can respond to changing market conditions. "You worry less about how accurately you can forecast demand," says Ron Gable, a managing partner in Coopers & Lybrand's SysteCon Division in Atlanta. In addition, cutting time out of the delivery process enables companies to reduce inventories because they don't have to warehouse goods as insurance for unexpected demand spikes.

Assuring a reliable flow of parts to manufacturing plants is another way to reduce cycle times. Whirlpool Corp. of Benton Harbor, Mich., wanted to keep its plant humming at peak performance, but "each of our 11 divisions was managing inbound logistics independently," says Dan Prickett, director of inbound logistics for the consumer appliance manufacturer. To cut costs, reduce inventory and achieve cycle-time efficiencies, Whirlpool knew it needed to consolidate its inbound logistics to make procurement faster and more efficient. "[But] we didn't have the tools to do it in a world-class manner," Prickett says. For Whirlpool, outsourcing was the answer.

The company turned to Ryder Dedicated Logistics of Miami, a logistics outsourcing company that is part of Ryder System Inc. Ryder's EDI links with more than 500 freight

The Robots are Coming! The Robots are Coming!

.....
IT sifts, sorts and directs packages

Some logistics systems today hardly require the touch of a human hand. At Inacom, a robotic conveyor system enabled the company to cut its order-fulfillment time and slash its handling costs from \$3 to \$1.20 per order. The mostly automated picking and sorting system begins with workers selecting components from warehouse shelves and applying Inacom and freight-carrier bar codes to each box. After workers place the products on the conveyor system, no further human action is necessary until items are loaded onto trucks.

As containers move on the conveyor, bar-code scanners identify the contents and their destinations. A proprietary OS/2-based system developed in C++ manages the robotic conveyor system that sorts packages based on truck routes. When packages arrive at the warehouse loading docks, drivers are spared the task of hand-sorting packages; instead they scan each box as it is loaded to provide data to both the carrier's tracking system and Inacom's shipment database. Because this process is automated, there's no need to reconcile invoices with bills of lading.

—P. Fabris

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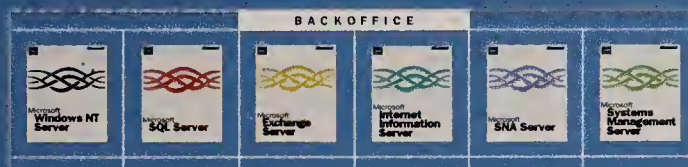
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Integrated Centralized Management Tools	YES	NO	NO
Integrated Internet Access (SMTP/MIME)**	YES	NO	NO
Integrated X.400 (1984&1988)**	YES	NO	NO
Built-in Group Scheduling	YES	YES	NO
Built-in Groupware	YES	NO	YES

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KEY TECHNOLOGIES

Transforming logistics calls for cutting-edge IT

■ **ELECTRONIC DATA INTERCHANGE (EDI) SYSTEMS:** EDI enables manufacturers, distributors and freight transportation companies to conduct paperless transactions in real-time. Some companies are experimenting with the Internet for EDI connectivity, but security and reliability issues make many companies cautious.

■ **BAR-CODE AND RADIO FREQUENCY TECHNOLOGY:** Bar-code labels and radio frequency (RF) technology have greatly streamlined storage and retrieval of pallets. Bar codes enable workers to catalog items, and RF connections between forklifts and inventory systems make locating items on warehouse shelves less labor-intensive and more efficient. Tracking inventory and the flow of goods with these technologies enables companies to give customers accurate shipment status data. Bar coding and EDI are essential for capturing point-of-sale data that enables accurate continuous replenishment operations.

■ **INTELLIGENT TRANSPORTATION PLANNING SYSTEMS:** These systems assist logistics personnel in selecting the best shipping routes according to price and reliability. Large retailers such as Wal-Mart, Kmart, Sears and Target, whose competitive pressures demand best practice logistics performance, typically build their own systems. A number of companies, particularly manufacturers, are turning to outsourcing firms such as Federal Express and Ryder System Inc. to leverage their cutting-edge transportation management systems.

■ **SATELLITE TRACKING:** This technology is used most often to track rail shipments in real-time. This feature is particularly crucial to support just-in-time manufacturing and distribution. Manufacturing plants need to know whether a shipment of supplies will be late so that they can adjust their production schedules.

carriers constitute a communications lifeline, providing timely, detailed information. That lifeline enables transportation planning personnel to select the carriers with the best prices, most efficient routes and highest reliability rankings within a shipping lane, that is, all the diverse transportation options between points A and B—including any combination of ocean shipping, rail and trucks, says Ryder System's Senior Vice President of Management Information Systems and CIO Bruce Parker. Third-party logistics providers leverage sophisticated IT systems for many customers, most of which can't afford to build those systems themselves. Ryder's expertise and advanced systems are crucial for logistics scenario planning, says Prickett. One of the reasons Whirlpool chose Ryder,

he says, was its "ability to crunch out results so that you can see many possibilities before you make a decision."

Armed with data supplied by Ryder, Whirlpool has cut operational costs "significantly, percentage-wise in the double digits," says Prickett. Consolidating logistics operations with Ryder's help enabled Whirlpool to increase its buying power with trucking and rail companies, reaping volume discounts. In the future, Whirlpool expects to boost inbound logistics efficiency enough to reduce product cycle times, Prickett says.

The transition to the outsourcing model had its bumps, he adds. A total of about 30 full-time Ryder employees work on-site at each of Whirlpool's 11 manufacturing facilities, as well as at a joint logistics nerve center in Cleveland. Turf issues surfaced—some Whirlpool personnel were reluctant to acknowledge that a third party could do a better job. Some managers were concerned about ceding control of a vital part of operations, fearing plants might have to shut down if Ryder's service lagged. Those fears have proven unfounded so far, says Prickett.

MEASURING PERFORMANCE

Still, while outsourcing logistics offers many advantages, companies need to weigh carefully the option before committing to it. "Sometimes it seems like too simple of a solution," cautions John Manrodt, a vice president and member of A.T. Kearney's supply chain integration core team at A.T. Kearney Inc.'s Alexandria, Va., office. "Going into it too quickly is a recipe for disaster." An outsourcing relationship must be a true partnership with clear performance measurements in place, Manrodt emphasizes.

Companies typically benchmark their own performance in logistics, and the performance of outsourcers, in several ways. They can:

- track on-time delivery rates—how fast they deliver product;
- factor in their accuracy rates—delivering the wrong product on time pleases no one;
- measure cycle time by recording the number of inventory turns achieved in a year (see "To Everything, Turn, Turn, Turn," *CIO*, May 1, 1996); and
- track logistics costs as a percentage of sales.

The average total logistics expense of companies in all industries equals 6.9 percent of sales, according to a recent study by D.E. Foster Partners Inc. of New York and Fordham University's Graduate School of

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Business. Still, some companies are willing to spend even more to reach best practice performance if they are convinced they can gain a competitive edge.

THE BIG PICTURE

Everyone working to improve logistics functions stresses that any logistics transformation must respect the bigger context of supply chain management strategy and corporate goals. Many companies team IS executives with supply chain, finance, manufacturing, and sometimes even sales and marketing personnel in cross-functional reengineering task forces that seek to reduce overall supply chain costs. Often, after companies revamp their supply chains, trucking costs rise because of shorter cycle times, but inventory and warehousing costs decrease. Examining an enterprise's entire operation is essential when considering logistics improvements. "Too many companies start in the middle of [the logistics process] instead of thinking about transforming the business to gain a competitive advantage," says Greg Owens, managing partner of logistics strategy for Andersen Consulting, based in Atlanta.

Owens Corning of Toledo, Ohio, strives to consider logistics improvements within a larger context. The \$3.6 billion manufacturer of high-performance glass composites and building materials systems is shooting for \$5 billion in sales by 2000. To achieve that, the company wants to increase its foreign business from about 27 percent of sales to 40 percent. Transforming disconnected logistics processes among 11 divisions with sites in 30 countries is a key part of the larger plan.

With that goal in mind, the company formed a cross-functional team from IS, capacity planning, production planning, warehouse management and shipment coordination to collaborate on supply chain reengineering. As Owens Corning takes a more integrated view of its business, the barriers between functions seem less rigid. Team members perceive themselves as contributors to the overall company mission, company officials say. Although much of the project is dependent upon IT, IS personnel are integrated into the reengineering teams. "IS is a true partner with business units," says David Johns, Owens Corning's director of global development. "In no way is this viewed as solely an IS project."

Although the company operates globally, with each division functioning independently, "we currently don't have global purchasing

power," says David Lepow, global development leader. Without global purchasing power, an enterprise has fewer options for shipping carriers as well as supply purchasing. (See "Buy Global, Skip Local," *CIO*, April 1, 1996.) By migrating from a hodgepodge of legacy systems to a common platform, Owens Corning expects to improve communication and coordination of supply chain processes—including logistics. The company will use SAP software as the backbone for the entire supply chain operation. Having a common system should enable dispersed locations to collaborate on transportation contracts and negotiate better prices with carriers.

B E N E F I T S

Transforming logistics

- **REDUCED CYCLE TIMES** enable better planning by more closely aligning production with demand.
- **CUSTOMER SERVICE IMPROVEMENTS** provide a competitive edge in industries where fast response times are critical. Hospitals, for example, require speedy shipments of replacement parts because they cannot afford to have their MRI machines down for long.
- **IMPROVING FULFILLMENT ACCURACY** leads to customer satisfaction. Sending a dozen cases of hot dogs on time to a grocery store that needs 20 doesn't cut the mustard.
- **REDUCED INVENTORIES** reduce costs. In some industries, such as apparel and high-technology, market demands change every quarter or two; no manufacturer wants to own a warehouse full of obsolete products.

However companies decide to go about it, one thing's for sure: They must move products faster, fulfill orders more accurately and do it all with less money. Now that powerful technology solutions exist, CIOs have an important role to play in logistics transformation (see "Key Technologies," Page 68). Andersen's Owens observes, "If the CIO is not involved in supply chain integration, the effort is not going to be successful." **CIO**

Staff Writer Peter Fabris can be reached at pfabris@cio.com

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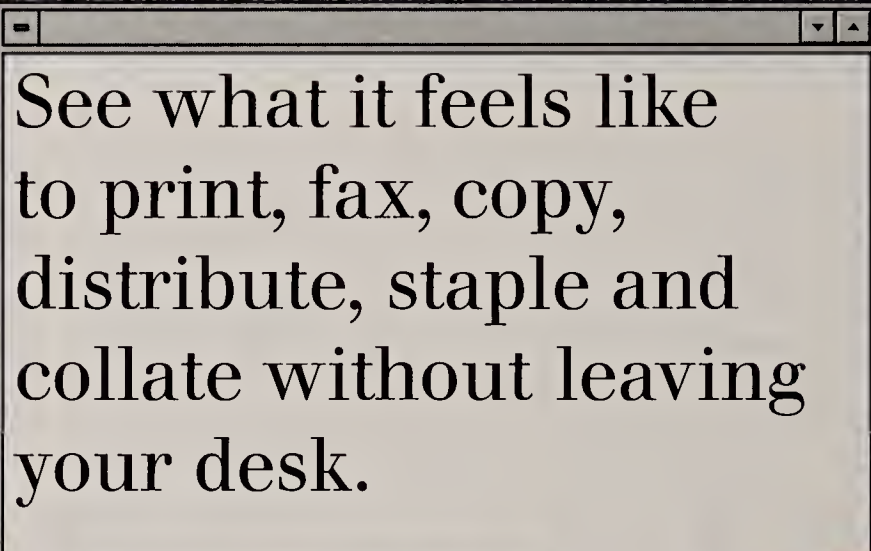
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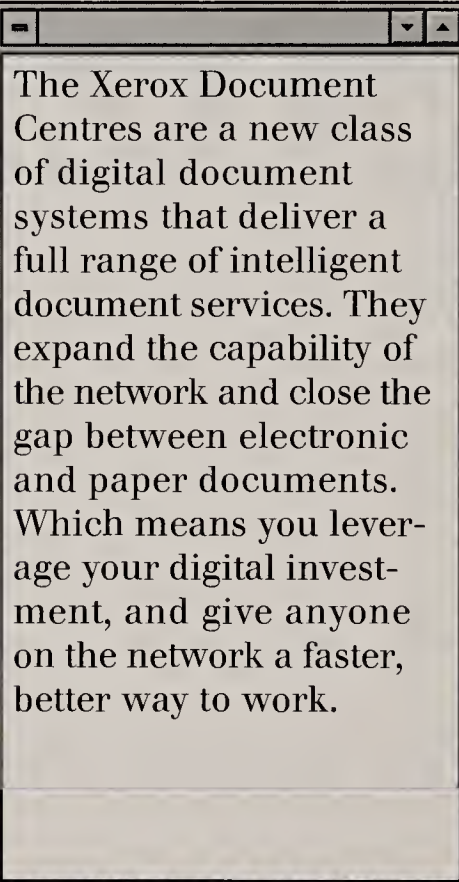
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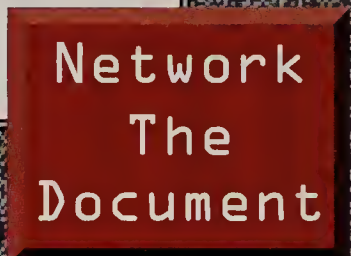




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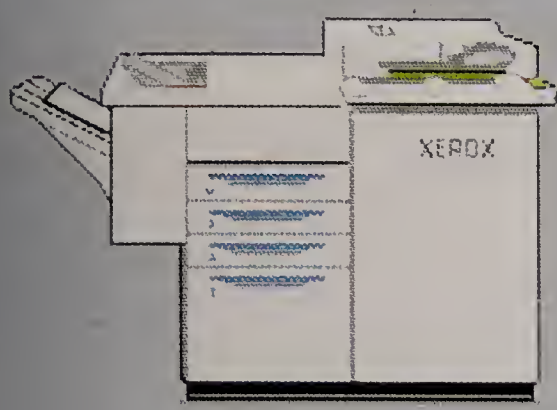
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EUROTUNNEL *information
services manager Jean-Pierre
Hebert is digging IS out of a hole.*

Light at the End of The Chunnel

BY MARSHA W. JOHNSTON

Systems for the English Channel's Eurotunnel were developed in the dark—without customers, users or clear knowledge of operating requirements—leading to costly mismatches between capabilities and needs. Now the Franco-British IS crew is hard at work on a three-year system reconstruction project.

IN THE SPOTLIGHT

EUROTUNNEL, PARIS AND LONDON

Business: Cross-channel transport company, operating between Folkestone, England, and Calais, France; Eurotunnel is the market leader for both freight and tourist traffic on this route

Revenues: £275 million (\$420 million U.S.)

Personnel: 3,000 employees; 75 in IS

Competition: Cross-channel ferry operators

THROUGHOUT THE NEARLY 200 YEARS THAT FRENCH AND British engineers dreamed of building a tunnel under the English Channel, they had never had the benefit of a reference model. In fact, their idea was usually either likened to one of Jules Verne's fanciful notions or, in the opinion of the United Kingdom's defense establishment, considered the folly of those who cared little for Britain's security. So on Dec. 1, 1990, when workers from the two countries finally broke through the subsurface chalk and linked up 132 feet below the bottom of the English Channel, the event was more than just the culmination of the world's most expensive and complex engineering project. It was the materialization of a dream and, for the tunnel's information



FRENCH AND BRITISH tunnelers link up 132 feet beneath the English Channel bottom.

BUSINESS CHALLENGES

- Renegotiate \$12.4 million debt
- Accelerate revenue stream
- Devise unique competitive strategy
- Bring systems support in line with unique commercial requirements

systems crew, the first tangible evidence that they would someday have a business on which to model their systems development.

As engineers and construction workers of the French-British joint venture labored over their unique enterprise, Eurotunnel's IS developers

"We were unique in the world, so we had nowhere to go to get advice or to learn from the mistakes of others."



—Jean-Pierre Hebert

struggled to conceptualize the applications that would support the world's first undersea international toll crossing. "In IS, they always say that to build a system, you have to start with users and ask them what kind of system they want you to build," says Information Services Manager Jean-Pierre Hebert, whose office is next to the tunnel entrance in Calais, France.

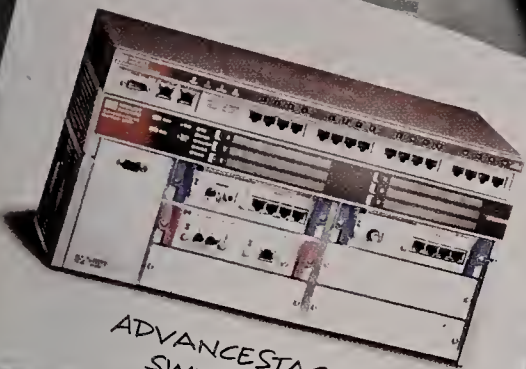
"But, for a long time, this was a construction site, and our business didn't exist. We were unique in the world, so we had nowhere to go to get advice or to learn from the mistakes of others. And we had no users." Eurotunnel's two rail-equipped tunnels began providing full-scale passage in the second half of 1994 for the high-speed Eurostar train and shuttles that ferry cars and trucks.

Hebert's U.S. peers may well know the struggle of getting users to specify requirements, but imagine the difficulty in obtaining proper user specs at a company that isn't operational and for which no precedents exist. How could systems hope to match requirements? For Eurotunnel, the mismatch was so significant that it prompted a 1995 freeze on new development so that the IS group could concentrate on bringing existing toll-management systems in line with business needs. The group used that free time to devise a three-year revision project, known as Rev98, that began this year. There's a particular fiscal urgency underscoring this effort: Eurotunnel's earnings are not keeping up with its debt-payment obligations. (In fall of 1995, the company said it would suspend payments on its \$12.4 million short-term debt.)

Eurotunnel's 30-plus systems comprise three major families: equipment systems for managing and maintaining rolling stock (the shuttles and maintenance vehicles) and fixed installations (power and water); financial systems, including accounting and toll management; and human resources management, which features a single system that encompasses two sets of national labor laws. During the tunnel's formative period, Hebert was in charge of developing equipment-management and -maintenance systems. He and the IS team tried to develop applications using theoretical data and data from other industries. To get the best selection of information possible, Eurotunnel hired IS people from the banking and industrial sectors for their expertise. "They were IT engineers, but were more oriented toward their particular industry than toward technology for technology's sake," Hebert says. "With them in place, we then asked ourselves, 'What kind of system *should* be necessary to manage such a business?'"

Hebert's team developed the company's equipment-management systems, but the toll- and traffic-management systems were delivered by Trans-Manche Link (TML), the tunnel's consortium of constructors. The Unitraffic consortium, led by French-British systems engineering company Sema Group, won the \$60 million subcontract to build the toll and traffic systems to specifications set in 1987. Given the dated specs and lack of an existing business history during development, it's not surprising that the toll system remains by far the most pressing work in progress.

Compounding the development-in-the-dark problem was the widely re-



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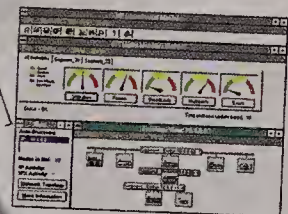
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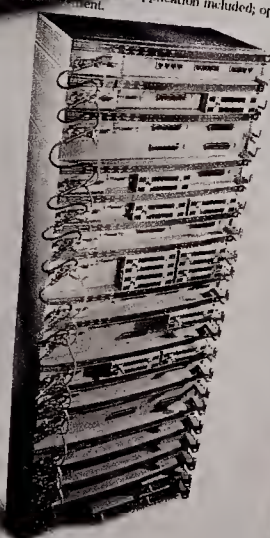


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IS STRATEGIES

- Overcome system shortcomings caused by inability to anticipate unique operating requirements
- Rework toll-collection system to more flexibly support changes in commercial strategies
- Freeze major new development to realize ROI on existing systems

EUROSTAR TRAINS and tunnel shuttles ferry freight, cars and passengers between England and France.

ported poor relations between Eurotunnel and contractor TML. As a consequence, Eurotunnel was not involved early enough in subcontractor Sema's work, and Sema wound up designing a traditional highway-type toll because that was its area of expertise, says Michel Chevrier, toll system manager for the French terminal.

Chevrier says it was not until 1992 that Eurotunnel began getting enough information on the toll system in development to realize that, under TML's direction, Sema was not designing the system it wanted. Eurotunnel's sales and marketing organization was still evolving and perfecting its strategies for ticket sales, distribution and promotions. Thus, "the base system had to be realized without any knowledge of Eurotunnel's future sales strategy," he says. With French highway tolls as a model, Sema had designed Eurotunnel's system exclusively as a "turn-up-and-go" system, in which operators collect money or prepaid

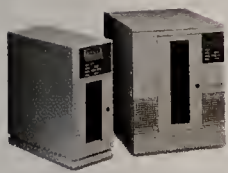
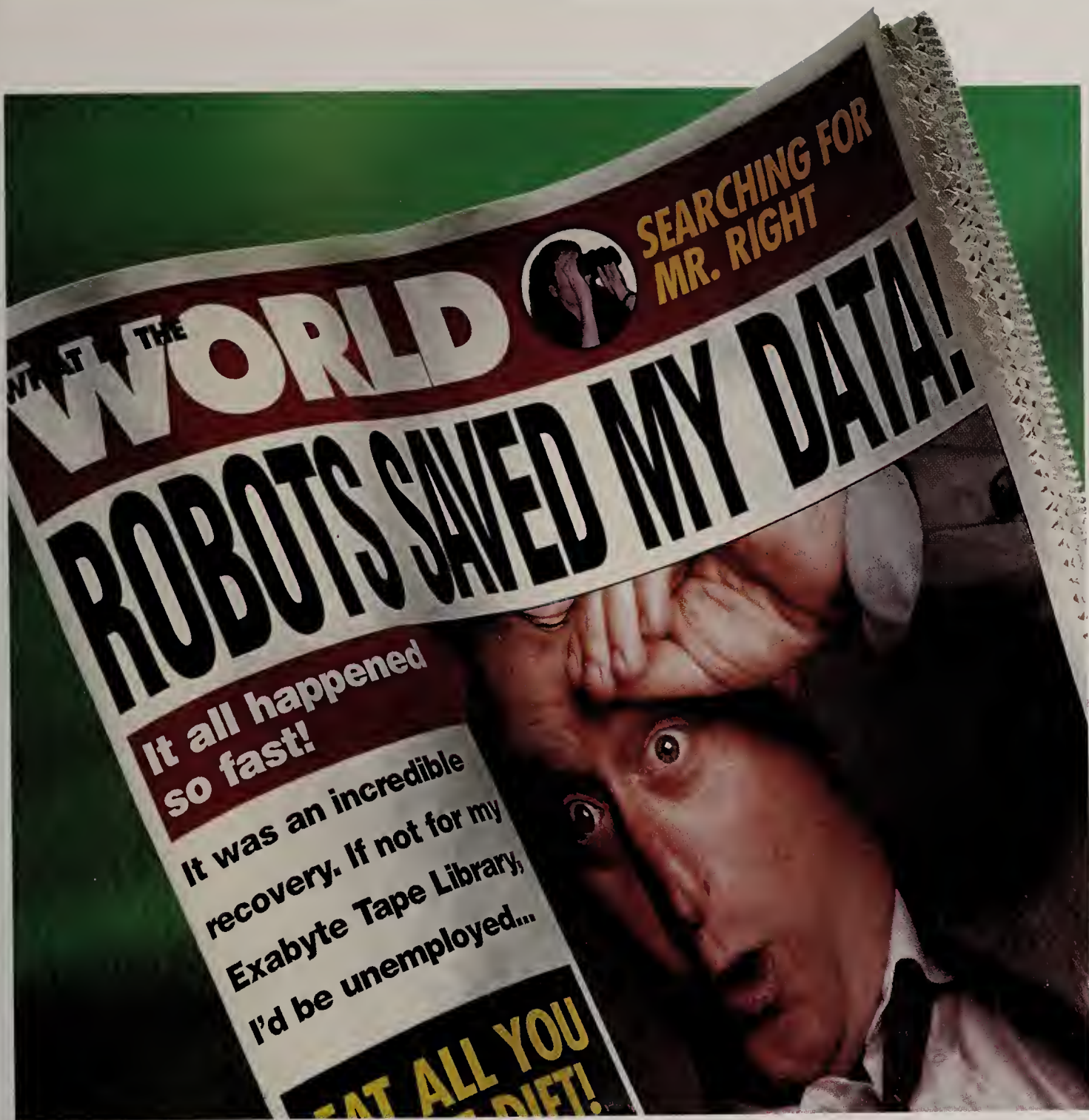
tickets from motorists. But Eurotunnel's operators not only collect cash on the spot; they take credit cards and process prepaid reserved tickets at toll-booths and terminal ticket counters as well. They also play host, greeting travelers and invariably answering questions about tunnel procedures and the shuttle's services, such as duty-free shopping and its hours of operation. "In fact," says Chevrier, "the only commonality between us and a highway toll system is that the operators are in booths, and it looks like the classic system."

With that realization, Eurotunnel contracted Sema Group directly to enlarge the base system functionality. The modified system, which has been in use since April 1994, is in its



last phase; full operation began in February. It now accepts French-style chip-equipped credit cards and exercises more control over credit card fraud. It also calculates and reports value-added tax (VAT) information (most toll companies are not subject to VAT, but Eurotunnel is).

But these modifications were just a start. Still to be addressed are other toll oversights and shortcomings that emerged once operations began, either due to Eurotunnel's own



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PICTURE A BLACK HOLE

The 1990 completion of the 31-mile-long English Channel tunnel dig was one of the most unlikely occurrences imaginable in the history of French-British relations. Initiatives to build an easier passage across the channel were mounted not once but five times since 1801. But as the years passed, it seemed the tunnel was doomed to be forever a work in progress, its realization repeatedly thwarted by political and military opposition, particularly on the part of the British.

Moving to quash Queen Victoria and Prince Albert's enthusiasm for a tunnel proposition in 1850s, British Foreign Secretary Henry John Temple Palmerston summed up the suspicion with which the British viewed the idea: "What? You expect us to contribute to an operation that would shrink a distance that we already find entirely too short?" Unthinkable indeed.

Not until the 1950s, when air travel had long since diminished the military protection afforded by the sea, would a British defense minister publicly declare that the country had no further objection to tunneling under the channel.

Military opposition wasn't the only negative impression with which tunnel planners had to contend. There had been a fearful, science-fiction-type aura surrounding the tunnel concept. "People had this scary image of the tunnel as this black, claustrophobic place resting on the bottom of the ocean," says Jean-Pierre Hebert, information services manager at Eurotunnel, the French-British joint venture that owns and operates the tunnel. "They were worried that it would develop a hole and the whole North Sea would come rushing in." In actuality, the tunnel was dug out of a layer of water-impermeable chalk below the ocean floor. "The chances of getting water into the tunnel are about the same as getting water into the tunnel at Mont Blanc," Hebert points out. If only executive fears over big-budget IS projects could be explained away as easily.

—M.W. Johnston

operating constraints or to commercial requirements that no one was able to predict. In the first weeks of operation, for example, shuttle capacity was limited, which meant that travelers had to reserve particular time slots. Unfortunately, "the system could handle tickets sold in advance

to promote sales, which also created problems for the existing application. "Changing tariffs three times a day was not envisioned at the beginning, but we had to do it to be competitive," says Tony Wilkinson, toll system manager at the British terminal in Folkestone. The current

the development freeze so that his team could concentrate on the Rev98 revision plan. Though the tunnel's financial straits add an urgency to all IS priorities, Hebert made the decision long before Eurotunnel announced its debt-payment suspension. "It was not a financial decision," he explains. "It was just my sense of

"Changing tariffs three times a day was not envisioned at the beginning, but we had to do it to be competitive."

—Tony Wilkinson

needing to tune up what we have and learn our business."

"What we're looking for with Rev98 is to have a system that is sufficiently flexible to process prepaid tickets at any time and with any set of rules or conditions," Wilkinson says. The company is still working on a technical specification, which will be large, he adds.

While Hebert does not see a direct role for IS in negotiating a means for Eurotunnel to ease its debt burden, he believes Rev98 will have several repercussions on Eurotunnel's revenue stream. Greater sales flexibility and the ability to track the effectiveness of all promotions could have a direct impact on increasing revenues. Better transaction control, information capture and more system reliability benefit customers by shortening the time they spend at the tollbooths and terminal ticket counters, he adds.

Having spent a year trying to comprehend Eurotunnel's business and IS's role in it, Hebert has a clear vision of the proper role for his systems. "I would like to get quickly to proactive systems instead of systems that just react to the competition," he says. Today, at least, he has a business model to follow. **CIO**

Marsha W. Johnston, a freelance writer based in Paris, can be reached at Mjohnston@mcimail.com

COMING UP European Spotlight: Italy's Pirelli



but not reservations that specified this or that hour and this or that shuttle," Hebert says. As a result, IS had to implement an application to manage reservations, which was eliminated as shuttle capacity increased.

Competition from channel ferry services prompted Eurotunnel to establish a wider range of transit fares

system is not flexible enough to handle frequent tariff changes, he adds. Eurotunnel's ultimate goal is to evolve the application into a marketing tool that will help manage customer accounts and mailings.

With so many toll system complications, Hebert, who became IS director in September 1994, instituted

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DEFINING VALUE

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- the ability of the enterprise to enter a new market;
- successful global operation or expansion;

- transformation of the way the enterprise competes within its customary market or of the terms of competition within the market;
- improvement of the enterprise's relationships with its external customers;
- improvement of the enterprise's relationships with its own employees or among its functions (such as marketing, finance or human resources);
- the ability of the enterprise to compete more effectively by adding to the sum of its available knowledge assets;
- leaner and more economical operations.

ENTRY GUIDELINES

- The system must have been operational prior to July 1, 1994.
- Entrants must agree to be featured, along with their systems and organizations, in a *CIO* article.
- Entries must be complete.
- Entries must be on 8.5-by-11-inch paper, one side per sheet.
- The application form may be reproduced.
- Multiple entries from one company will be considered, but each entry must be submitted separately.
- Entries must be made jointly by the IS executive *AND* the business sponsor for whom the system delivers value.
- IT vendors, public relations and advertising companies, consultants and other third parties may *NOT* apply on behalf of another company. They are encouraged to forward this form to the “owner” of the system, or to contact *CIO* Communications to recommend that an application form be sent to the client.
- All entries must be computer generated or typed; no handwritten entries will be accepted.
- When feasible, an additional copy of the entry should be sent on a 3½ -inch disk. Electronic entries must be limited to word-processing and spreadsheet packages that are compatible with Microsoft Word and Microsoft Excel on a Windows or Macintosh platform.

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2. A measurable financial return attributable to the system
3. The pervasiveness of information technology—in other words, the strategic objective could not have been met without IT's contribution
4. Collaboration between an IT and business executive

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ENTERPRISE VALUE AWARDS TIMELINE

APPLICATION DUE: July 1, 1996

JUDGES SELECT WINNERS: October 1996

WINNERS ANNOUNCED: October 1996

AWARDS CEREMONY: Feb. 2-5, 1997
at the CIO Enterprise Value Retreat

1. COMPANY/BUSINESS UNIT

▲ NAME OF PARENT COMPANY

CITY, STATE WHERE HEADQUARTERS ARE LOCATED

PUBLICLY OR PRIVATELY HELD?

ANNUAL REVENUES

INDUSTRY

NAME OF BUSINESS UNIT OR ORGANIZATION

CITY, STATE WHERE LOCATED

NUMBER OF EMPLOYEES AT BUSINESS UNIT

2. ENTRANTS

A.

▲ NAME OF ENTERING I.S. EXECUTIVE

TITLE

NAME OF DIVISION, DEPARTMENT OR UNIT

ADDRESS

CITY

STATE

ZIP

()

()

TELEPHONE

FAX

B.

▲ NAME OF ENTERING BUSINESS-UNIT EXECUTIVE

TITLE

NAME OF DIVISION, DEPARTMENT OR UNIT

ADDRESS

CITY

STATE

ZIP

()

()

TELEPHONE

FAX

3. SUPPORTERS

Please list four people who are willing to be interviewed with regard to the system, its development, its use and the value returned. At least one should be a member of the technology team that developed the system and should have played a significant role. At least one should be a primary user from the sponsoring business unit. The other two may be from either organization or represent suppliers, customers or others intimately familiar with the system.

A.

▲ NAME

TITLE

()

()

TELEPHONE

FAX

REASON FOR INCLUSION

B.

▲ NAME

TITLE

()

()

TELEPHONE

FAX

REASON FOR INCLUSION

C.

▲ NAME

TITLE

()

()

TELEPHONE

FAX

REASON FOR INCLUSION

D.

▲ NAME

TITLE

()

()

TELEPHONE

FAX

REASON FOR INCLUSION

MAIL TO:

DEADLINE:
JULY 1, 1996

**ENTERPRISE VALUE AWARDS
CIO COMMUNICATIONS, INC.
492 OLD CONNECTICUT PATH
P.O. BOX 9208
FRAMINGHAM, MA 01701-9208**

4. THE NOMINATED ORGANIZATION

Please tell us about your organization (company, business unit, agency) in 500 words or less. Include information on:

- when the organization was founded;
- mission statement;
- major products and services;
- markets served;
- any other data you believe to be relevant in terms of general background.

5. THE NOMINATED SYSTEM

Tell us about the nominated system and demonstrate its importance to the organization by completing the following sections. Please limit your material to two pages.

SYSTEM DESCRIPTION: In one sentence or less, describe the system or IT initiative you are nominating (e.g., order-entry or document-management system; switch to a client/server architecture).

TECHNICAL PROFILE: Briefly describe the technology of the nominated system. Please include the names of major vendors and products. (NOTE: The examples provided here are meant to be illustrative, not all-inclusive.)

- **ARCHITECTURE** (e.g., client/server, mainframe)
- **HARDWARE** (e.g., mainframe/parallel processor, mini-computer/server, PCs, handheld devices)
- **SOFTWARE** (e.g., operating systems, database system, shells, application software)
- **SOFTWARE DEVELOPMENT TOOLS** (e.g., CASE, 4GLs, GUI developers, object-oriented development tools)
- **NETWORK/COMMUNICATIONS HARDWARE, SOFTWARE AND SERVICES** (e.g., modems, routers, e-mail packages, carriers and public networks)

6. BUSINESS IMPACT

Describe the primary business objectives of and value delivered by the IT investment. Please limit this section to five pages.

SCOPE AND IMPACT: Identify the functions (e.g., customer service, manufacturing, planning) that were changed by the system, the nature of those changes and their impact on the business.

STATEMENT OF VALUE: In one or two sentences, describe the business value delivered by the nominated system (please refer to "Defining Value" section on the first page of the application form).

BUSINESS VALUE DESCRIPTION: In detail, describe *how* the system delivers the value identified above. Also describe any added value delivered, whether intentionally sought or serendipitously encountered.

THE IMPORTANCE OF IT: Identify the different components of the overall business change (e.g., business reengineering, downsizing, cycle times). Explain the importance of the IT component to the overall business change. Could the results have been achieved without IT?

COLLABORATION: Describe how the business unit and IS organization worked together throughout the project, from concept to implementation. What were the specific tasks fulfilled by the business unit? The IS organization?

7. QUANTIFYING ROI

Provide a detailed, one-page summary of the nominated system's investment costs (including all upfront development expenses and annual maintenance charges). Also provide estimates of returns (including increased profits,

reduced costs and indirect cost-avoidance). Estimates of costs and returns should be made per annum over a five-year period.

8. TRUTH OF INFORMATION/RELEASE

The following release must be signed by both nominating executives if the application is to be considered. *Unsigned releases will invalidate the entry.*

I HEREBY STATE that the information provided is true and complete to the best of my knowledge and belief.

I AUTHORIZE the release and use of, in connection with the Enterprise Value Awards program, any and all materials furnished by me or others at the company contacted for this judging. I understand that information submitted on this application or subsequently gathered during the evaluation and judging process may be used in articles or any other type of publicity relating to the Enterprise Value Awards program.

I ALSO AUTHORIZE the release and use of my name, my company's name and my likeness, including but not limited to any photographs and any recording of my voice or image that may be taken of me for *CIO Magazine*. I agree that no compensation shall be due me or my company for such usage.

I RECOGNIZE that failure to meet these conditions or to provide sufficient material that can be published can cause the application to be rejected at any point in the process at the sole discretion of the sponsors.

1.

▲ SIGNATURE OF NOMINATING I.S. EXECUTIVE

DATE

2.

▲ SIGNATURE OF NOMINATING BUSINESS EXECUTIVE

DATE

9. OTHER EDITORIAL OPPORTUNITIES

If you are not selected as an award recipient, are you willing to be contacted for inclusion in other articles in *CIO Magazine*? YES ☐ NO ☐

How did you learn about the Enterprise Value Awards program?

- | | |
|---|--|
| ☐ CIO MAGAZINE | ☐ ACADEMICIAN |
| ☐ CONSULTANT | ☐ IS STAFF MEMBER |
| ☐ SYSTEMS INTEGRATOR | ☐ OTHER PUBLICATIONS |
| ☐ PR AGENCY | ☐ VENDOR |
| ☐ ADVERTISING AGENCY | ☐ OTHER (PLEASE IDENTIFY) |

CHECKLIST

HAVE YOU FILLED OUT...?

- ☐ Company/Business-Unit, Entrants and Supporters Information

HAVE YOU INCLUDED ON SEPARATE PAGES...?

- ☐ Nominated Organization
- ☐ Nominated System
- ☐ Business Impact
- ☐ Return on Investment

HAVE BOTH ENTRANTS SIGNED AND DATED...?

- ☐ Truth of Information/Release

HAVE YOU CHECKED OFF...?

- ☐ Other Editorial Opportunities
- ☐ How you learned about the Enterprise Value Awards program?

CONGRATULATIONS TO LAST YEAR'S WINNERS

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John P. Glaser, PhD
Vice President, Information Systems
Jeffrey Otten
CEO

GENSYM CORP.

Troy A. Heindel
CIO & Vice President, Support Services
Lowell Hawkinson
Chairman & CEO

MCDONNELL DOUGLAS HELICOPTER SYSTEMS

Andrew Miller
Director, Information Technology
William R. Ringer
Business Development Representative

ROCKWELL INTERNATIONAL CORP. SPACE SYSTEMS DIVISION

Kodumudi S. Radhakrishnan
Division Director, Information Management
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The Coffee Connection

Beyond enabling interactivity and animation on the Web, can Java supply the jolt organizations need to make truly distributed, networked computing a reality?

BY DENNIS HAMILTON

In May of last year, Sun Microsystems Inc. introduced a new, object-oriented, portable programming language called Java. Since then, Java has been propelled to prominence like no language that preceded it. Proponents hail Java as a tool that will enable seamless networked computing by making even mission-critical client/server applications portable, while critics denounce it as a programming toy for building gimmicky pages on the Web. For CIOs, the question has been whether to embrace Java as an important strategic programming weapon or to ignore it as the fad of the day.

IS executives would be mistaken to think of Java as merely a transient distraction. On the Web, Java is already delivering animation and three-dimensionality, and it's letting users play games, submit queries, buy merchandise and interact with applications. But it may ultimately allow organizationwide distribution of up-to-the-minute applications and information—and it may, in fact, be one answer to IS's client/server implementation headaches. Some facts:

■ Java is architecture-neutral and portable, allowing developers to write small applications or "applets" that can be delivered to and run by Java-enabled Web browsers. It was designed to support applications on networks, and early implementations indicate it does this well. Because Java is an interpreted language, a Java application written on one platform need not be altered to run on another. (The Java compiler generates architecture-neutral bytecode instructions, an intermediate form of code that can be transported easily over a network. The instructions are then translated by the Java interpreter into a format that the client machine understands, enabling execution of the program on virtually any machine.)

The ability to distribute applications, fixes and upgrades over a network—all regardless of platform—has alone garnered the attention of software vendors and users. "The real power of Java is that it provides a new paradigm for creating and distributing applications over large networks," says Larry Podmolik, director of technology for Chicago-based Strategic Technology Resources (STR), a systems integrator. "Java and HotJava help bring true client/server computing to the Internet."

■ The Java environment supports distributed processing, meaning it can enable users to get the applications and information they need no matter where they reside on the network. It provides access not only to files and objects on an internal "intranet" but also to those on the Internet itself, thanks to its ability to converse with TCP/IP and Web protocols. The Java environment also lets developers reduce network traffic by downloading intelligence to the desktop, thereby shifting the burden of processing from the server to clients.



ILLUSTRATION BY JAMES ENDICOTT

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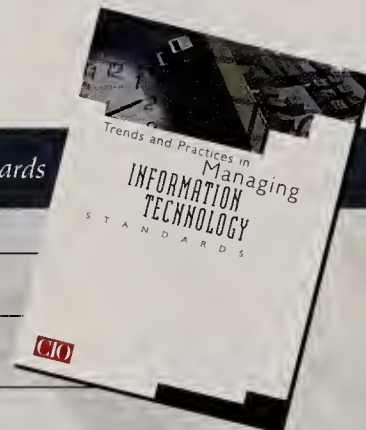
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JAVA IN ACTION

■ Java is object-oriented. Sun's developers incorporated many of C++'s object-oriented features into Java, allowing for reuse of software components. This has also meant a greater familiarity and faster learning curves for the legions of programmers familiar with C++.

■ Java enables interactivity and adaptability. By taking advantage of multithreading, which allows applications to have multiple concurrent "threads" of activity, developers using Java have begun to turn the Web from a static medium of text and images into one of animation, 3-D and true—if so far low-level—interactivity (see box, Page 89). Java also lets developers link new code modules on demand from across a network; that allows applications to adapt to changing environments, enables transparent software updates and makes it possible to provide evolving online services.

■ Java is more secure than C or C++ because it doesn't contain pointers, which make a system vulnerable to hackers and programming errors. Sun developed Java to handle distributed processing tasks in embedded consumer electronics applications when C++, the popular object-oriented language, proved too unwieldy. Over a five-year development cycle, the \$6 billion Mountain View, Calif., vendor of enterprise network computing products built Java without such C++ features as pointers, operator overloading, multiple inheritance and extensive automatic coercions.

But like any new language, Java has its problems. When Sun CEO, president and chairman Scott McNealy proclaimed that Java "will unleash the reengineering of the planet and the whole economic system," he hadn't yet been hit with the first wave of complaints about it. For example, Princeton University researchers found a flaw in the byte-code Verifier, which assures that applications downloaded over the Internet adhere to Java's language safety rules. That means a hacker could send a "malicious" applet that could damage a user's machine.

The ability to tailor a user's query is one of Java's most promising applications.

Industry observers expect the following kinds of applets to be available before year's end:

■ **Users searching a database** of software define the functionality they want in the application, and all applications that meet those criteria are presented in data sheet form. Clicking on the application data sheet that most closely matches the criteria downloads an interactive demo version. If the user wants the application, she can click to download the application itself.

■ **A user clicks on a Web page** of vacation resorts and a platform-independent applet is downloaded to his machine. Using the applet, he can narrow the location, indicate availability, specify recreation facilities required, etc. Upon finding a match, he can select a multimedia applet using CD-quality sound and images that will let him "tour" the resort he has selected.

■ **A geographic information system** could use applets beginning with an aerial image of the United States. Clicking on the New York area would download an applet of the New York skyline. A click on Manhattan would provide an aerial view of the island. By clicking on the World Trade Center, users could download a list of tenants, go online at the New York Stock Exchange or order theater tickets.

—D. Hamilton

While that doesn't pose a major threat to intranet applications, Sun says fixes are underway, as are improvements to elements such as the molasses-slow compiler. Another complaint is that Java doesn't yet work on older Macintosh and Windows systems that don't support multithreading. And although Java is simpler to use than C and C++, it's

still a sophisticated environment that requires knowledge of object-oriented programming and software management skills.

So where is Java really headed? Computer Intelligence InfoCorp (CII), a computer industry analyst in La Jolla, Calif., maintains that practical applications are so new that they have shown up only sporadically in its surveys of thousands of IS shops. "But what's interesting," says CII Senior Analyst Jerry S. Berry "is that when we ask about Java, everybody now says, 'Yeah, we've got a group studying it.' People are looking at Java. It's early yet, but the interest is there."

That interest got a jump-start last year with some preemptive marketing that put the software directly into the hands of the people who could make it a programming standard on the burgeoning Web. In March 1995, Sun made the language and its documentation available free of charge on the Web. Within the first week, more than 100,000 interested parties had downloaded the instruction set, after which Sun stopped counting. Java's ability to move among platforms and enliven the Web with sound, animation and application functionality stole the hearts of Web site managers within weeks.

In May 1995, Sun also announced a Web browser, HotJava, that allows access to all of the Java sites springing up on the Internet. HotJava can retrieve the Java applets, then run them on any client machine. Even more important, last summer Mountain View, Calif.-based Netscape Communications Corp., which owns more than 75 percent of the browser market, announced that its new Navigator 2.0 browser would support Java, making it possible for surfers to view and interact with Web pages containing Java applets. And Netscape Navigator Gold, the company's specialized browser for Web page creators, does all that *and* comes with a range of Java tools, all for only \$79. So rapid was Java's acceptance that Microsoft Corp. Chairman Bill Gates was forced to reassess his company's strategy for Internet tools; ultimately,

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THE MAGAZINE FOR INFORMATION EXECUTIVES

Microsoft purchased a Java license and recently announced that it will incorporate support for Java into Windows 95 and Windows NT.

In January, Sun spun off a new company, JavaSoft, to develop, market and support Java technology. Its mission is to create Java development tools and applications in conjunction with third-party developers, which have been instrumental in Java's startling rise to prominence. More than 3,000 of them showed up in March, when Netscape hosted the first Java conference in San Francisco during its Internet Developers Conference. The sold-out event showcased applications and tools, suggesting that at least Internet developers were taking Java seriously.

The big question has been whether Java will be used beyond the small Internet applications—almost 2,000 applets are viewable on the Web at this writing—and become prevalent

in larger, mission-critical applications that require a language with Java's attributes of platform independence, security and portability.

Some observers still have doubts that Java can be refined into a language for large systems. "There are some serious questions about whether existing Java implementations can scale to support even medium-size programs," says Stephen C. North of AT&T spinoff Lucent Technologies in Murray Hill, N.J. "Consider the software configuration management problems of deciding what files have to be recompiled when a class changes. Right now the environment doesn't provide much support. If you want to be safe, you just recompile everything."

David Chancellor, an independent Java programmer in Pittsburgh, points to a problem he says is inherent. "Java doesn't execute today at near the speed of a C-compiled ap-

plication," he says. It is axiomatic in computing: The trade-off for relative simplicity, such as what Java offers, is often decreased processing speed. That in itself will keep some client/server application developers content with older, faster technology. But many observers expect that Sun's in-line native compiler, anticipated for delivery in the second quarter of this year, will overcome much of the performance problem.

In fact, some tenured developers say Java's potential is almost as dramatic as McNealy suggested. Centura Software Corp. in Menlo Park, Calif., sees promise for Java as a strategic development tool and is rolling it into its own development products. "The Java Interpreter will be incorporated into Centura Team Developer, enabling developers to build Java applets as well as two- and three-tier client/server applications," says Matt Miller, vice president of

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JAVA TASTE TEST

marketing for Centura. "With Centura, organizations can link their client/server applications and databases to the Web and build Java-powered applications as they need them."

Centura is not alone in thinking big about Java:

■ National Semiconductor Inc. in Santa Clara, Calif., worked with Cadis Inc. in Boulder, Colo., to develop a system with Java that allows customers to interactively search for and locate information on any of the company's 30,000 products via the Web. The system enables design engineers and other customers to search National's product database by selecting attributes of interest without having to know any part numbering sequence, data sheet naming scheme or description text.

■ Dun & Bradstreet Software Services Inc. in Atlanta is using Java to develop a Web front end for its client/server purchasing product.

For a look at how companies are using Java on the Web, check out these sites using a Java-compatible browser:

<http://www.cnet.com/Content/Reviews/Compare/Pc100/0,30,,0200.html>

c|net Inc.'s interactive PC scoreboard helps visitors choose a PC. Users indicate how they plan to use the computer and rate the importance of characteristics such as performance, software bundling and price and the applet provides a list of PC systems to consider. Putting the cursor over a system's name brings up a panel with information about the system.

<http://www.intrepid.com/~robertl/index.html> Robert's Online Pricers leads to pages with JavaScript and Java financial applets such as a commissions pricer, loan pricer, option pricer and portfolio pricer.

<http://www.acl.lanl.gov/~rdaniel/classesJDK/PickTest2.html> This applet draws two medical images side-by-side: a frontal X-ray and a transverse slice from part of the lung. Drag the yellow line on the X-ray to choose which slice to see.

-D. Hamilton

■ Compuware Corp. in Milwaukee is developing a prototype of the Medical Image Viewer, a system that would allow physicians and radiologists to download from a network repository into local memory spe-

cialized image-reading applications.

Power players such as Oracle Corp. in Redwood Shores, Calif., and Sybase Inc. in Emeryville, Calif., also are developing Java versions of client/server products and develop-

ment tools. Borland International Inc., in Scotts Valley, Calif., is developing a rapid application development toolkit for Java (code-named Latté). And IBM Corp. in Armonk, N.Y., plans to support Java in its own Web browser, servers and in its Lotus Notes integrated messaging and groupware software. In addition, IBM intends to port Java technology to its OS/2 and AIX operating systems as well as include it in copies of Microsoft's Windows 3.1 that are shipped with its computers. At one year, Java might lack a wide array of live applications, but it's not short of support among industry heavyweights.

One type of application with huge potential is software distribution. In April, Cambridge, Mass.-based Integrated Computer Solutions Inc. held its first IntraNet technical conference in New York to address the financial community's need for Java-based ap-

"With Java, the network and the applications truly become ubiquitous.

Software and services could be as accessible as a dial tone on your telephone."

—John Gawkowski

plications. "Wall Street will be the first to capitalize on Java's ability to develop corporate intranets, or corporate information infrastructures," says Peter Winston, president of ICS. "Using Java to develop these intranets, organizations will be able to consistently provide the latest versions of sophisticated client/server applications and distributed information to all employees, in both local and remote locations."

David Zimmerman, senior software engineer at Widget Workshop Inc., a Cary, N.C.-based software developer, says Java opens the door to much smoother ways of distributing applications and managing information than anything that existed before. "Let's say I'm using Microsoft Office," he explains. "All I want is Microsoft Word. With Java I don't have to keep the whole Office suite on my desktop computer. I don't even have to keep all of Microsoft Word. I can just download from the network those portions of the application I need."

Likewise, Coris, a division of R.R. Donnelley & Sons Co., is developing a Java application designed to help the company bring its publishing and distribution software and services to market more effectively. "With Java, the network and the applications truly become ubiquitous," says John Gawkowski, senior software architect. "This means software and ser-

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WANT A REFILL?

vices could be as accessible as a dial tone on your telephone."

Like many Java developers, STR's Podmolik says the huge push on the Web to develop small applets—things such as spinning globes or waving flags—has created low expectations for Java. "Most people overlook that Java is a full-featured, object-oriented language, which puts it in sharp contrast to the Internet-only tools with which it is too often associated," he says. "That gives Java the power and flexibility to enable us to build and deploy mission-critical, enterprise client/server applications over the Internet."

It is too soon, however, to say that Java will become the language standard for portable client/server systems. The language is still in its infancy, and most Java-based, mission-critical applications are still under development. There are performance obstacles to over-

For more information on Java and links to Java resources, check out http://www.cio.com/WebMaster/wm_multimedia.html.

come, cultural hurdles to surmount, a learning curve to conquer and legacy systems to evaluate—not to mention the possibility of another software giant hard at work developing a competing programming environment.

But it's not too soon to say that Java, which contains some of the most interesting capabilities of any language in the past 20 years, is important and getting more so by the day as more than 100,000 developers tinker with it out in cyberspace. And given the heavyweight supporting cast with stakes in the outcome, Java's problems are likely curable. What's more, the language's ability

to smoothly distribute to any platform not only applications but portions of them—along with object applets that can be added as a user requires—is worthy of consideration in a CIO's tactical plan.

Java fell into its future with the advent of the World Wide Web, where it is installed and evolving, bringing the Internet to life. Its sheer versatility on the Web in tandem with its massive distribution ensures that Java will remain part of most programming stables, certainly those that are wired to the Internet. With Java applets of all sizes sprouting up around them, CIOs can't afford to write off the language as a fad. **CIO**

Dennis Hamilton, a freelance writer based in Indianapolis, is the author of The 60-Minute Guide to Netscape Navigator 2.0 (IDG Books Worldwide Inc., 1996). He can be reached at cato@iquest.net.

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FYI

Minding P's & Q's

For businesses that want to place their cost, profit and performance measurement activities in a common, multiuser software product, Price Waterhouse LLP offers the new Activa.

Activa is an activity-based cost management software that serves as both a calculation engine and a data warehouse. Operating in a client/server environment, Activa links multiple users in an open-system, relational database that allows users to perform such accounting functions as budgeting, costing, forecasting and performance management. Activa is designed to help companies track their performance on a recurring basis, to get a better handle on operational causes and effects.



A C T I V A

Developed by a team of functional and technical consultants from the United States, Europe and Australia at Price Waterhouse and Thermo King, a Westinghouse company, Activa operates with a Windows-based Graphical User Interface, and while it is designed to run independently from legacy systems, it is capable of importing legacy data for editing and processing.

For additional information about Activa, call Price Waterhouse at 314 982-5717.

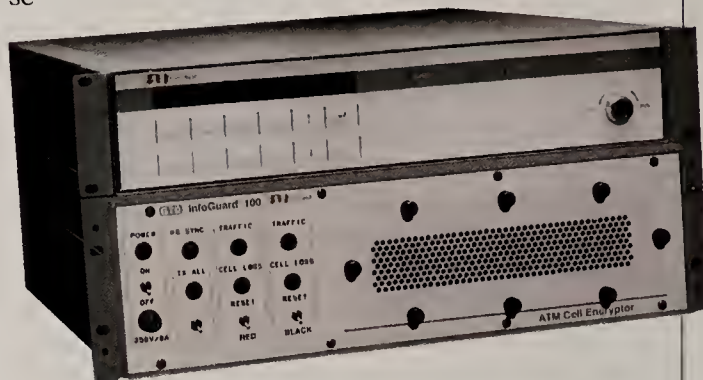
Public privacy for ATM

The migration of private implementations of asynchronous transfer mode (ATM) services onto public networks means a heightened threat to the security of sensitive data—and the lack of safeguards has made many companies reluctant to try public ATM.

To provide the high levels of integrity and privacy necessary to send data, voice and video simultaneously, GTE Government Systems Corp. and Cylink Corp. have released InfoGuard 100, an ATM cell encryptor. InfoGuard 100 authenticates end points and switches, providing end-to-end protection of sensitive data through a public or private ATM network. InfoGuard creates a virtual private network—in effect a sealed pipeline that passes through a public network.

InfoGuard 100 can be combined with GTE's SpaNet 4050 switch to provide more comprehensive security features, including authentication, integrity and misdelivery protection. The InfoGuard 100 payload encryptor enables

identification of connections as secure or nonsecure as soon as a link is set up and before transmission begins.



InfoGuard 100 complies with the ATM Forum UNI 3.1 standard. The data encryption standard (DES) algorithm used is approved by the National Institute of Standards and Technology (NIST), and key management is based on the Diffie-Hellman public-key technique (ANSI X9.42). Joint developers GTE and Cylink will support InfoGuard 100 through their customer service organizations. InfoGuard 100 is available for \$49,950. For more information, call (408) 735-5800 or (617) 449-2000.

Bridge over troubled waters

According to Gartner Group Inc., the total cost of addressing the year 2000 problem is between \$300 billion and \$600 billion worldwide. Yet many companies won't get much bang for their bucks because they're not looking beyond fixing the two-digit date problem. But with Bridge2000 from LexiBridge Corp. of Monroe, Conn., companies can not only correct the year 2000 problem for as little as 25 percent less than rewriting code, they can improve and correct date-related field structures, processing logic and data while simultaneously providing a full client/server migration of existing systems.

Designed for CICS/Cobol computer applications, Bridge2000 contains a four-phase year 2000 solution of discovery, correction, verification and deployment. The program quickly discovers and corrects two-digit year cases in a system's data structures and implements necessary changes in referencing program logic. Physical data fields containing two-digit years are expanded and reloaded into relational database management system tables (RDBMS) using LexiBridge's DataBridge tool. Next, the LexiBridge Migration Workbench completely rearchitects and migrates the application to client/server. Online CICS transactions are converted to Powersoft Corp.'s PowerBuilder environment. VSAM data structures are migrated to a choice of popular relational database management system servers, and batch processes are recoded in popular Cobol environments such as Micro Focus Inc.'s Micro Focus Cobol.

Price depends on the size and complexity of the application. For further information, call 203 459-8228 or visit LexiBridge's site on the World Wide Web at <http://www.lexibridge.com>.

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A Coordinated Campaign

Hobbled by decentralized fund-raising efforts, Harvard University developed a client/server-based system that coordinates activities

There's a common phrase at Harvard University that speaks volumes about the institution's culture: "Each tub is on its own bottom." Translation: Each of the university's 10 schools and affiliated institutions is an independent unit with the freedom to operate the way it thinks best.

Such decentralization proved less than ideal for fund-raising as stand-alone databases inevitably led to duplicated effort. When Harvard made plans to launch a five-year, \$2 billion fund-raising campaign in May 1994, it was clear the university's traditional approach had to change. A single information system implemented later that year has since enabled several schools to coordinate their efforts and raise more money faster than ever before.

Until recently, each school conducted its own fund-raising efforts in isolation, according to Debbie Parker-Johnson, associate director for development computing services at Harvard in Cambridge, Mass. Information on all Harvard's alumni and prospects was kept in a central legacy database, but the individual schools were not linked to it. Instead, schools could access only the small subsets of that data—mainly information on their own graduates—that had been manually input to their own local database. Because it's common for grads to

have attended more than one school at Harvard, alumni often were targeted by fund-raisers in multiple schools. Not only was much effort duplicated, but there was also competition for the "major givers"—the 10 percent of the university's donors who contribute 90 percent of the funds received.

Further, to do any sort of manipulation of data, fund-raisers often had to rekey information from their databases into spreadsheets or word processors on their desktops. Reporting could be done only through the development computing services office, which was frequently backlogged with requests.

Harvard needed an "industrial strength" system, Parker-Johnson says—one that could support 300 to 400 users, manage more than 600,000 prospects, and provide online and report access to information. Under the direction of James Conway, the director of development computing services, a project team used Blyth Software Inc.'s Omnis 7 to develop Holden, Harvard's new client/server fund-raising system. Development began in March 1994 and was completed in December.

Today, 300 users—including roughly 75 fund-raisers plus others involved in activities such as

event management—have direct access from their desktops to alumni, prospect and gift information. While the legacy database is still the system of record, a copy now resides in a Sybase Inc. database on a Sun Microsystems Inc. server, and the two are kept in sync via nightly updates. Using Omnis 7 as a front end, users can view data, generate reports or download data directly into Microsoft Corp.'s Microsoft Excel or Microsoft Word.

Holden also acts much like a sales contact management system, allowing users to enter tracking information about their prospects. And because all data is in one central repository, fund-raisers can coordinate their efforts to avoid duplication and contention for major givers.

Not all Harvard's schools use Holden yet, but already the system's benefits are clear. Not only did Holden help Harvard raise \$1.1 billion by March of 1996, but the system has streamlined the fund-raising process and given users access to data they never had before. Says Parker-Johnson, "Fund-raisers can do tasks more quickly, so they can do more fund-raising."

—Katherine Auer

Katherine Auer is a freelance writer and editor based in Bloomington, Ind.

VITAL STATISTICS

Organization: Harvard University, Cambridge, Mass.

Application: Fund-raising management system

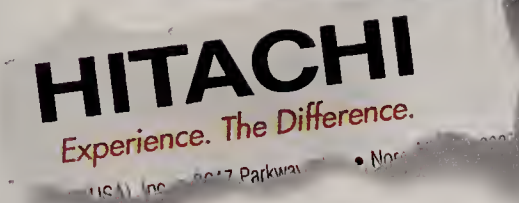
Sponsor: Tom Reardon, associate vice president for alumni affairs and development (now vice president)

Technologies: Blyth Software's Omnis 7; Macintosh and Windows-based desktop machines; Sun 690 server; Sybase database; Ethernet LAN; legacy Cobol database runs on a Hewlett-Packard Co. HP 3000

Scope: 300 users at Harvard and in its Los Angeles and New York offices; includes roughly 75 fund-raisers

Objective: To raise \$2 billion in five years; to improve fund-raising efforts universitywide by enabling coordination among schools and providing easier data access and sharing

Payoff: \$1.1 billion raised by March 1996; improved fund-raising coordination and access to data; streamlined process allowing fund-raisers to spend more time on value-adding activities



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